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**SAF-B03-015**  
**Remaining Sites Confirmation**  
**Sampling-Soil**  
**FINAL VALIDATION PACKAGE**

**MAIL COMPLETE COPY OF VALIDATION PACKAGE TO:**

Jeanette Duncan (2)

B & 12/28  
INITIAL/DATE

**SAF-B03-015**

**SDG** **H 2776**

**Sample Location/Waste Site:** **100-F-12 French Drain at**  
**105-F**

**RECEIVED**  
JAN 31 2005  
**EDMC**

Date: 16 November 2004  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: Remaining Sites Confirmation Sampling - Soil - Waste Site 100-F-12  
Subject: Inorganic - Data Package No. H2776-LLI (SDG No. H2776)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H2776-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Waste Site | Analysis   |
|-----------|-------------|-------|------------|------------|------------|
| J01XV2    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR3    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR4    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR5    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |

1 - ICP metals; mercury by 7471A.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## **DATA QUALITY PARAMETERS**

- Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

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- **Preparation (Method) Blanks**

#### Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to preparation blank contamination, the chromium result in sample J01XR5 was qualified as an estimate and flagged "J".

Due to preparation blank contamination, the boron result in samples J01XR3, J01XR4 and J01XR5 were qualified as estimates and flagged "J".

Due to preparation blank contamination, the molybdenum result in samples J01XV2, J01XR3 and J01XR5 were qualified as estimates and flagged "J".

All other preparation blank results were acceptable.

#### Field (Equipment) Blank

One equipment blank (J01XR5) was submitted for analysis. Aluminum, boron, barium, calcium, chromium, copper, iron, potassium, magnesium, manganese, molybdenum, sodium, nickel, lead, silicon and zinc were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

#### Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the

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effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to an MS recovery outside QC limits (277%), all antimony results were qualified as estimates and flagged "J".

Due to an MS recovery outside QC limits (58%), all silicon results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (33%), all calcium results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (48%), all silicon results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J01XR3/J01XR4) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. All reported results met the analyte specific RDL.

- **Completeness**

Data package No. H2776-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to preparation blank contamination, the chromium result in sample J01XR5 was qualified as an estimate and flagged "J". Due to preparation blank contamination, the boron result in samples J01XR3, J01XR4 and J01XR5 were qualified as estimates and flagged "J". Due to preparation blank contamination, the molybdenum result in samples J01XV2, J01XR3 and J01XR5 were qualified as estimates and flagged "J". Due to an MS recovery outside QC limits (277%), all antimony results were qualified as estimates and flagged "J". Due to an MS recovery outside QC limits (58%), all silicon results were qualified as estimates and flagged "J". Due to an RPD outside QC limits (33%), all calcium results were qualified as estimates and flagged "J". Due to an RPD outside QC limits (48%), all silicon results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

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## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

## **Appendix 2**

### **Summary of Data Qualification**

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# INORGANIC DATA QUALIFICATION SUMMARY\*

| SDG: H2776          | REVIEWER:<br>TLI | DATE: 11/16/04            | PAGE <u>1</u> OF <u>1</u> |
|---------------------|------------------|---------------------------|---------------------------|
| COMMENTS:           |                  |                           |                           |
| COMPOUND            | QUALIFIER        | SAMPLES AFFECTED          | REASON                    |
| Boron               | J                | J01XR3, J01XR4,<br>J01XR5 | Blank<br>contamination    |
| Chromium            | J                | J01XR5                    | Blank<br>contamination    |
| Molybdenum          | J                | J01XV2, J01XR3,<br>J01XR5 | Blank<br>contamination    |
| Silicon<br>Antimony | J                | All                       | MS recovery               |
| Silicon<br>Calcium  | J                | All                       | RPD                       |

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

|                          |     |            |    |          |    |           |    |          |    |        |
|--------------------------|-----|------------|----|----------|----|-----------|----|----------|----|--------|
| Project: BECHTEL-HANFORD |     |            |    |          |    |           |    |          |    |        |
| Laboratory: LLI          |     |            |    |          |    |           |    |          |    |        |
| Case:                    |     | SDG: H2776 |    |          |    |           |    |          |    |        |
| Sample Number            |     | J01XV2     |    | J01XR3   |    | J01RX4    |    | J01RX5   |    |        |
| Remarks                  |     |            |    |          |    | Duplicate |    | E. Blank |    |        |
| Sample Date              |     | 10/11/04   |    | 10/11/04 |    | 10/11/04  |    | 10/11/04 |    |        |
| Inorganics               | RQL | Result     | Q  | Result   | Q  | Result    | Q  | Result   | Q  | Result |
| Silver                   | 0.2 | 0.08       | U  | 0.09     | U  | 0.09      | U  | 0.08     | U  |        |
| Aluminum                 |     | 4980       |    | 6050     |    | 6670      |    | 41.8     |    |        |
| Arsenic                  |     | 2.6        |    | 2.5      |    | 2.6       |    | 0.34     | U  |        |
| Boron                    |     | 5.7        |    | 0.95     | J  | 0.99      | J  | 0.91     | J  |        |
| Barium                   | 20  | 100        |    | 65.0     |    | 68.7      |    | 0.88     |    |        |
| Beryllium                |     | 0.35       |    | 0.41     |    | 0.44      |    | 0.009    | U  |        |
| Calcium                  |     | 13100      | J  | 3320     | J  | 3560      | J  | 24.8     | J  |        |
| Cadmium                  | 0.2 | 0.21       |    | 0.06     |    | 0.11      |    | 0.03     | U  |        |
| Cobalt                   |     | 6.2        |    | 6.7      |    | 6.9       |    | 0.08     | U  |        |
| Chromium                 | 1   | 9.2        |    | 9.3      |    | 10.5      |    | 0.37     | J  |        |
| Copper                   |     | 16.9       |    | 12.3     |    | 12.9      |    | 0.07     |    |        |
| Iron                     |     | 16200      |    | 18700    |    | 19700     |    | 83.4     |    |        |
| Mercury                  | 0.2 | 0.88       |    | 0.02     | U  | 0.02      |    | 0.02     | U  |        |
| Potassium                |     | 802        |    | 1230     |    | 1320      |    | 19.0     |    |        |
| Magnesium                |     | 3650       |    | 3690     |    | 3930      |    | 5.5      |    |        |
| Manganese                |     | 250        |    | 313      |    | 318       |    | 2.6      |    |        |
| Molybdenum               |     | 0.49       | J  | 0.22     | J  | 0.13      | U  | 0.16     | J  |        |
| Sodium                   |     | 244        |    | 114      |    | 160       |    | 8.9      |    |        |
| Nickel                   |     | 10.0       |    | 9.9      |    | 11.2      |    | 0.12     |    |        |
| Lead                     | 5   | 13.8       |    | 4.5      |    | 4.3       |    | 0.22     |    |        |
| Antimony                 |     | 0.27       | UJ | 0.29     | UJ | 0.29      | UJ | 0.28     | UJ |        |
| Selenium                 | 1   | 0.35       | U  | 0.37     | U  | 0.38      | U  | 0.37     | U  |        |
| Silicon                  |     | 343        | J  | 302      | J  | 329       | J  | 36.2     | J  |        |
| Vanadium                 |     | 43.5       |    | 43.7     |    | 45.5      |    | 0.06     | U  |        |
| Zinc                     |     | 49.0       |    | 39.8     |    | 46.1      |    | 3.7      |    |        |

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE           | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|-------------------|--------|-------|--------------------|--------------------|
| -001   | J01XV2  | Silver, Total     | 0.08 u | MG/KG | 0.08               | 1.0                |
|        |         | Aluminum, Total   | 4980   | MG/KG | 0.73               | 1.0                |
|        |         | Arsenic, Total    | 2.6    | MG/KG | 0.32               | 1.0                |
|        |         | Boron, Total      | 5.7    | MG/KG | 0.46               | 1.0                |
|        |         | Barium, Total     | 100    | MG/KG | 0.02               | 1.0                |
|        |         | Beryllium, Total  | 0.35   | MG/KG | 0.009              | 1.0                |
|        |         | Calcium, Total    | 13100  | MG/KG | 0.62               | 1.0                |
|        |         | Cadmium, Total    | 0.21   | MG/KG | 0.03               | 1.0                |
|        |         | Cobalt, Total     | 6.2    | MG/KG | 0.07               | 1.0                |
|        |         | Chromium, Total   | 9.2    | MG/KG | 0.05               | 1.0                |
|        |         | Copper, Total     | 16.9   | MG/KG | 0.04               | 1.0                |
|        |         | Iron, Total       | 16200  | MG/KG | 2.0                | 1.0                |
|        |         | Mercury, Total    | 0.88   | MG/KG | 0.02               | 1.0                |
|        |         | Potassium, Total  | 882    | MG/KG | 3.1                | 1.0                |
|        |         | Magnesium, Total  | 3650   | MG/KG | 0.59               | 1.0                |
|        |         | Manganese, Total  | 250    | MG/KG | 0.009              | 1.0                |
|        |         | Molybdenum, Total | 0.49   | MG/KG | 0.12               | 1.0                |
|        |         | Sodium, Total     | 244    | MG/KG | 0.21               | 1.0                |
|        |         | Nickel, Total     | 10.0   | MG/KG | 0.11               | 1.0                |
|        |         | Lead, Total       | 13.8   | MG/KG | 0.17               | 1.0                |
|        |         | Antimony, Total   | 0.27 u | MG/KG | 0.27               | 1.0                |
|        |         | Selenium, Total   | 0.35 u | MG/KG | 0.35               | 1.0                |
|        |         | Silicon, Total    | 343    | MG/KG | 0.45               | 1.0                |
|        |         | Vanadium, Total   | 43.5   | MG/KG | 0.05               | 1.0                |
|        |         | Zinc, Total       | 49.0   | MG/KG | 0.04               | 1.0                |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE           | RESULT   | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|-------------------|----------|-------|--------------------|--------------------|
| -----  | -----   | -----             | -----    | ----- | -----              | -----              |
| -002   | J01XR3  | Silver, Total     | 0.09 u   | MG/KG | 0.09               | 1.0                |
|        |         | Aluminum, Total   | 6050     | MG/KG | 0.77               | 1.0                |
|        |         | Arsenic, Total    | 2.5      | MG/KG | 0.34               | 1.0                |
|        |         | Boron, Total      | 0.95 J   | MG/KG | 0.49               | 1.0                |
|        |         | Barium, Total     | 65.0     | MG/KG | 0.02               | 1.0                |
|        |         | Beryllium, Total  | 0.41     | MG/KG | 0.01               | 1.0                |
|        |         | Calcium, Total    | 3320 J   | MG/KG | 0.66               | 1.0                |
|        |         | Cadmium, Total    | 0.06     | MG/KG | 0.03               | 1.0                |
|        |         | Cobalt, Total     | 6.7      | MG/KG | 0.08               | 1.0                |
|        |         | Chromium, Total   | 9.3      | MG/KG | 0.06               | 1.0                |
|        |         | Copper, Total     | 12.3     | MG/KG | 0.05               | 1.0                |
|        |         | Iron, Total       | 18700    | MG/KG | 2.2                | 1.0                |
|        |         | Mercury, Total    | 0.02 u   | MG/KG | 0.02               | 1.0                |
|        |         | Potassium, Total  | 1230     | MG/KG | 3.3                | 1.0                |
|        |         | Magnesium, Total  | 3690     | MG/KG | 0.63               | 1.0                |
|        |         | Manganese, Total  | 313      | MG/KG | 0.01               | 1.0                |
|        |         | Molybdenum, Total | 0.22 J   | MG/KG | 0.12               | 1.0                |
|        |         | Sodium, Total     | 114      | MG/KG | 0.22               | 1.0                |
|        |         | Nickel, Total     | 9.9      | MG/KG | 0.11               | 1.0                |
|        |         | Lead, Total       | 4.5      | MG/KG | 0.18               | 1.0                |
|        |         | Antimony, Total   | 0.29 u J | MG/KG | 0.29               | 1.0                |
|        |         | Selenium, Total   | 0.37 u   | MG/KG | 0.37               | 1.0                |
|        |         | Silicon, Total    | 302 J    | MG/KG | 0.48               | 1.0                |
|        |         | Vanadium, Total   | 43.7     | MG/KG | 0.06               | 1.0                |
|        |         | Zinc, Total       | 39.8     | MG/KG | 0.04               | 1.0                |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE           | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|-------------------|--------|-------|--------------------|--------------------|
| =====  | =====   | =====             | =====  | ===== | =====              | =====              |
| -003   | J01XR4  | Silver, Total     | 0.09 u | MG/KG | 0.09               | 1.0                |
|        |         | Aluminum, Total   | 6670   | MG/KG | 0.80               | 1.0                |
|        |         | Arsenic, Total    | 2.8    | MG/KG | 0.35               | 1.0                |
|        |         | Boron, Total      | 0.99   | MG/KG | 0.50               | 1.0                |
|        |         | Barium, Total     | 68.7   | MG/KG | 0.02               | 1.0                |
|        |         | Beryllium, Total  | 0.44   | MG/KG | 0.01               | 1.0                |
|        |         | Calcium, Total    | 3560   | MG/KG | 0.68               | 1.0                |
|        |         | Cadmium, Total    | 0.11   | MG/KG | 0.03               | 1.0                |
|        |         | Cobalt, Total     | 6.9    | MG/KG | 0.08               | 1.0                |
|        |         | Chromium, Total   | 10.5   | MG/KG | 0.06               | 1.0                |
|        |         | Copper, Total     | 12.9   | MG/KG | 0.05               | 1.0                |
|        |         | Iron, Total       | 19700  | MG/KG | 2.2                | 1.0                |
|        |         | Mercury, Total    | 0.02   | MG/KG | 0.01               | 1.0                |
|        |         | Potassium, Total  | 1320   | MG/KG | 3.4                | 1.0                |
|        |         | Magnesium, Total  | 3930   | MG/KG | 0.65               | 1.0                |
|        |         | Manganese, Total  | 318    | MG/KG | 0.01               | 1.0                |
|        |         | Molybdenum, Total | 0.13 u | MG/KG | 0.13               | 1.0                |
|        |         | Sodium, Total     | 160    | MG/KG | 0.23               | 1.0                |
|        |         | Nickel, Total     | 11.2   | MG/KG | 0.12               | 1.0                |
|        |         | Lead, Total       | 4.3    | MG/KG | 0.19               | 1.0                |
|        |         | Antimony, Total   | 0.29 u | MG/KG | 0.29               | 1.0                |
|        |         | Selenium, Total   | 0.38 u | MG/KG | 0.38               | 1.0                |
|        |         | Silicon, Total    | 329    | MG/KG | 0.49               | 1.0                |
|        |         | Vanadium, Total   | 45.5   | MG/KG | 0.06               | 1.0                |
|        |         | Zinc, Total       | 46.1   | MG/KG | 0.04               | 1.0                |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 04101868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE           | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|-------------------|--------|-------|--------------------|--------------------|
| =====  | =====   | =====             | =====  | ===== | =====              | =====              |
| -004   | J01XR5  | Silver, Total     | 0.08 u | MG/KG | 0.08               | 1.0                |
|        |         | Aluminum, Total   | 41.8   | MG/KG | 0.76               | 1.0                |
|        |         | Arsenic, Total    | 0.34 u | MG/KG | 0.34               | 1.0                |
|        |         | Boron, Total      | 0.91   | MG/KG | 0.48               | 1.0                |
|        |         | Barium, Total     | 0.88   | MG/KG | 0.02               | 1.0                |
|        |         | Beryllium, Total  | 0.009u | MG/KG | 0.009              | 1.0                |
|        |         | Calcium, Total    | 24.8   | MG/KG | 0.65               | 1.0                |
|        |         | Cadmium, Total    | 0.03 u | MG/KG | 0.03               | 1.0                |
|        |         | Cobalt, Total     | 0.08 u | MG/KG | 0.08               | 1.0                |
|        |         | Chromium, Total   | 0.37   | MG/KG | 0.06               | 1.0                |
|        |         | Copper, Total     | 0.07   | MG/KG | 0.05               | 1.0                |
|        |         | Iron, Total       | 83.4   | MG/KG | 2.2                | 1.0                |
|        |         | Mercury, Total    | 0.02 u | MG/KG | 0.02               | 1.0                |
|        |         | Potassium, Total  | 19.0   | MG/KG | 3.3                | 1.0                |
|        |         | Magnesium, Total  | 5.5    | MG/KG | 0.62               | 1.0                |
|        |         | Manganese, Total  | 2.6    | MG/KG | 0.009              | 1.0                |
|        |         | Molybdenum, Total | 0.16   | MG/KG | 0.12               | 1.0                |
|        |         | Sodium, Total     | 8.9    | MG/KG | 0.22               | 1.0                |
|        |         | Nickel, Total     | 0.12   | MG/KG | 0.11               | 1.0                |
|        |         | Lead, Total       | 0.22   | MG/KG | 0.18               | 1.0                |
|        |         | Antimony, Total   | 0.28 u | MG/KG | 0.28               | 1.0                |
|        |         | Selenium, Total   | 0.37 u | MG/KG | 0.37               | 1.0                |
|        |         | Silicon, Total    | 36.2   | MG/KG | 0.47               | 1.0                |
|        |         | Vanadium, Total   | 0.06 u | MG/KG | 0.06               | 1.0                |
|        |         | Zinc, Total       | 3.7    | MG/KG | 0.04               | 1.0                |

*jr* 11/14/04

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## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**





## Analytical Report

Client: TNU-HANFORD B03-015

LVL#: 0410L868

SDG/SAF#: H2776/B03-015

W.O.#: 11343-606-001-9999-00

Date Received: 10-13-04

### METALS CASE NARRATIVE

1. This narrative covers the analyses of 4 soil samples.
2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
3. All analyses were performed within the required holding times.
4. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. The preparation/method blanks for 3 analytes were outside method criteria. {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
  - a). The MB results for Barium, Calcium, and Sodium were greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level} and sample J01XR5 read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample results were reported herein "uncorrected" for the levels found in the MB.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. The matrix spike (MS) recoveries for 6 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

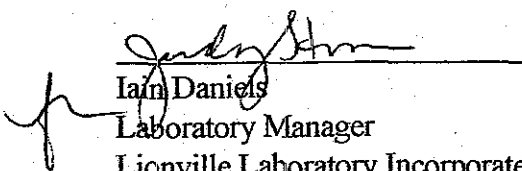
The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 22 pages.

000016

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration level for the following analytes:

| <u>Sample ID</u> | <u>Element</u> | <u>PDS</u>                 | <u>PDS</u>        |
|------------------|----------------|----------------------------|-------------------|
|                  |                | <u>Concentration (ppb)</u> | <u>% Recovery</u> |
| J01XV2           | Aluminum       | 20,000                     | 103.7             |
|                  | Calcium        | 20,000                     | 124.3             |
|                  | Iron           | 20,000                     | 95.8              |
|                  | Antimony       | 100                        | 105.2             |
|                  | Silicon        | 2000                       | 93.0              |

12. The duplicate analyses for 4 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

jjw/m10-868

11/11/04  
Date

|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|---|--|---|--|---|--|--------------------------------------|--------------------|--|-------------|--------------------------------------|--|-------|--|
| <b>Bechtel Hanford Inc.</b>   |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |   |  |                                      | <b>B03-015-262</b> |  | Page 1 of 1 |                                      |  |       |  |
| Collector<br>Stankovich/Rivera  |  | Company Contact<br>M Stankovich                 |  | Telephone No.<br>531-7620               |  | Project Coordinator<br>KESSNER, JH   |                    | Price Code <del>8D</del><br>8C   |             | Data Turnaround<br>7 Days<br>15 Days |  |       |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                 |  | Sampling Location<br>100-F-12                   |  | SAF No.<br>B03-015                      |  | Air Quality <input type="checkbox"/> |                    | CKR 10/11/04   |             |                                      |  |       |  |
| Ice Chest No.<br>ERC 01 030   |  | Field Logbook No.<br>EL 1578-3                  |  | COA<br>C10F126700                       |  | Method of Shipment<br>Fed Ex         |                    |  |             |                                      |  |       |  |
| Shipped To<br>LVL<br><del>EDERLINE SERVICES (Formerly TMA)</del>                  |  | Offsite Property No.<br>A050 013                |  | Bill of Lading/Air Bill No.<br>SEE OSPC |  |                                      |                    |  |             |                                      |  |       |  |
| POSSIBLE SAMPLE HAZARDS/REMARKS<br><br>Special Handling and/or Storage<br>Cool 4c |  |   |  | Preservation                            |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  | Type of Container                       |  | G/P                                  |                    | G/P  |             | aG                                   |  | aG    |  |
|   |  |   |  | No. of Container(s)                     |  | 1                                    |                    | 1  |             | 1                                    |  | 1     |  |
|   |  |   |  | Volume                                  |  | 250mL                                |                    | 120mL  |             | 250mL                                |  | 250mL |  |
| SAMPLE ANALYSIS   |  |   |  | See item (1) in Special Instructions.   |  | Chromium Hex - 71%                   |                    | PCBs - 8082; Residues - 8001; Chloro-Hydrocarbons - 8081; CRK 10/11/04   |             | PAHs - 8310                          |  |       |  |
|   |  |   |  |   |  |                                      |                    | TPH (Total) - 418.1  |             |                                      |  |       |  |
| Sample No.  |  | Matrix *  |  | Sample Date                             |  | Sample Time                          |                    |  |             |                                      |  |       |  |
| J01XV2  |  | SOIL  |  | 10/11/04                                |  | 0920                                 |                    | X  |             | X                                    |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
| CHAIN OF POSSESSION   |  |   |  | Sign/Print Names                        |  |                                      |                    | SPECIAL INSTRUCTIONS   |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    | (1) ICP Metals - 6010TR (SW846) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV)<br><br>Personnel not available to relinquish samples from 3728 Ref # 28 on 10/12/04 |             |                                      |  |       |  |
| Chris Rivera Chris Rivera   |  | 10/11/04 1320                                   |  | 3728 Ref. 28                            |  | 10/11/04 1320                        |                    |  |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    |  |             |                                      |  |       |  |
| REF 2B 3728   |  | 10/12/04 0900                                   |  | SIGALE/MLH                              |  | 10/12/04 0900                        |                    |  |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    |  |             |                                      |  |       |  |
| SIGALE/MLH  |  | 10/12/04 0900                                   |  | FED EX                                  |  |                                      |                    |  |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    |  |             |                                      |  |       |  |
| FED EX  |  | 10-13-04 1005                                   |  | FED EX                                  |  | 10-13-04 1005                        |                    |  |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                   |  | Date/Time                            |                    |  |             |                                      |  |       |  |
|   |  |   |  |   |  |                                      |                    |  |             |                                      |  |       |  |
| LABORATORY SECTION  |  | Received By                                     |  | Title                                   |  |                                      |                    | Date/Time  |             |                                      |  |       |  |
| FINAL SAMPLE DISPOSITION  |  | Disposal Method                                 |  | Disposed By                             |  |                                      |                    | Date/Time  |             |                                      |  |       |  |

|   |  |   |  |   |                   |                                       |                   |   |  |  |
|---|--|---|--|---|-------------------|---------------------------------------|-------------------|---|--|--|
| <b>Bechtel Hanford Inc.</b>   |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |   |                   | <b>B03-015-261</b>                    |                   | Page 1 of 1   |  |  |
| Collector<br>Stankovich/Rivera  |  | Company Contact<br>M Stankovich                 |  | Telephone No.<br>531-7620                   |                   | Project Coordinator<br>KESSNER, JH    |                   | Price Code <b>8B</b><br>Data Turnaround   |  |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                               |  | Sampling Location<br>100-F-12                   |  | SAF No.<br>B03-015                          |                   | Air Quality <b>8C</b><br><b>11</b>    |                   | <b>7 Days</b><br><b>15 Days</b>   |  |  |
| Ice Chest No. <b>ERC 01 030</b>   |  | Field Logbook No.<br>EL 1578-3                  |  | COA<br>C10F126700                           |                   | Method of Shipment<br>Fed Ex          |                   | <b>CKR 10/11/04</b>   |  |  |
| Shipped To <b>LVL</b><br><b>EXPRESS SERVICES (Formerly TMA)</b>                                 |  | Offsite Property No. <b>A050 013</b>            |  | Bill of Lading/Air Bill No. <b>SEE OSPC</b> |                   |                                       |                   |   |  |  |
| <b>POSSIBLE SAMPLE HAZARDS/REMARKS</b><br><br><b>Special Handling and/or Storage</b><br>Cool 4c |  | Preservation                                    |  |   |                   |                                       |                   |   |  |  |
|   |  | Type of Container                               |  | G/P   | G/P               | G/P                                   | AG                | G   |  |  |
|   |  | No. of Container(s)                             |  | 1   | 1                 | 1                                     | 1                 | 1   |  |  |
|   |  | Volume  |  | 1000mL                                      | 250mL<br><b>B</b> | 120mL<br><b>R</b>                     | 250mL<br><b>A</b> | 60mL<br><b>Am 10/11/04</b>  |  |  |
| <b>000019</b>   |  | <b>SAMPLE ANALYSIS</b>                          |  | See item (1) in Special Instructions.       |                   | See item (2) in Special Instructions. |                   | Chromium Hex - 7196   |  |  |
|   |  |   |  |   |                   |                                       |                   | PCBs - 8082;<br><del>Pesticides - 8001, Chloro-<br/>Methoxide - 8001, 8002, 8003, 8004, 8005, 8006, 8007, 8008, 8009, 8010, 8011, 8012, 8013, 8014, 8015, 8016, 8017, 8018, 8019, 8020, 8021, 8022, 8023, 8024, 8025, 8026, 8027, 8028, 8029, 8030, 8031, 8032, 8033, 8034, 8035, 8036, 8037, 8038, 8039, 8040, 8041, 8042, 8043, 8044, 8045, 8046, 8047, 8048, 8049, 8050, 8051, 8052, 8053, 8054, 8055, 8056, 8057, 8058, 8059, 8060, 8061, 8062, 8063, 8064, 8065, 8066, 8067, 8068, 8069, 8070, 8071, 8072, 8073, 8074, 8075, 8076, 8077, 8078, 8079, 8080, 8081, 8082, 8083, 8084, 8085, 8086, 8087, 8088, 8089, 8090, 8091, 8092, 8093, 8094, 8095, 8096, 8097, 8098, 8099, 8100, 8101, 8102, 8103, 8104, 8105, 8106, 8107, 8108, 8109, 8110, 8111, 8112, 8113, 8114, 8115, 8116, 8117, 8118, 8119, 8120, 8121, 8122, 8123, 8124, 8125, 8126, 8127, 8128, 8129, 8130, 8131, 8132, 8133, 8134, 8135, 8136, 8137, 8138, 8139, 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9800, 9801, 9802, 9803, 9804, 9805, 9806, 9807, 9808, 9809, 9810, 9811, 9812, 9813, 9814, 9815, 9816, 9817, 9818, 9819, 9820, 9821, 9822, 9823, 9824, 9825, 9826, 9827, 9828, 9829, 9830, 9831, 9832, 9833, 9834, 9835, 9836, 9837, 9838, 9839, 9840, 9841, 9842, 9843, 9844, 9845, 9846, 9847, 9848, 9849, 9850, 9851, 9852, 9853, 9854, 9855, 9856, 9857, 9858, 9859, 9860, 9861, 9862, 9863, 9864, 9865, 9866, 9867, 9868, 9869, 9870, 9871, 9872, 9873, 9874, 9875, 9876, 9877, 9878, 9879, 9880, 9881, 9882, 9883, 9884,</del> |  |  |

## **Appendix 5**

### **Data Validation Supporting Documentation**

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## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

|                             |              |                  |                     |                |   |
|-----------------------------|--------------|------------------|---------------------|----------------|---|
| ALIDATION LEVEL:            | A            | B                | <u>C</u>            | D              | E |
| PROJECT:                    | RWS 100-F-12 |                  | DATA PACKAGE: H2776 |                |   |
| VALIDATOR:                  | TLI          | LAB:             | LLI                 | DATE: 11/12/07 |   |
|                             |              |                  | SDG:                | H2776          |   |
| ANALYSES PERFORMED          |              |                  |                     |                |   |
| <u>SW-846/ICP</u>           | SW-846/GFAA  | <u>SW-846/Hg</u> | SW-846 Cyanide      |                |   |
|                             |              |                  |                     |                |   |
| SAMPLES/MATRIX              |              |                  |                     |                |   |
| JOIXR2 JOIXR3 JOIXR4 JOIXR5 |              |                  |                     |                |   |
|                             |              |                  |                     |                |   |
|                             |              |                  |                     |                |   |
|                             |              |                  |                     |                |   |
| Soil                        |              |                  |                     |                |   |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/AInitial calibrations acceptable? ..... Yes No N/AICP interference checks acceptable? ..... Yes No N/AICV and CCV checks performed on all instruments? ..... Yes No N/AICV and CCV checks acceptable? ..... Yes No N/AStandards traceable? ..... Yes No N/AStandards expired? ..... Yes No N/ACalculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A  
 ICB and CCB results acceptable? (Levels D, E)..... Yes No N/A  
 Laboratory blanks analyzed?..... Yes No N/A  
 Laboratory blank results acceptable?..... Yes No N/A  
 Field blanks analyzed? (Levels C, D, E)..... Yes No N/A  
 Field blank results acceptable? (Levels C, D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Comments: Boron - J 3,4+5 CR - S-J moly 23+5 - J

FB - al, boron, barium, Calcium, CR, Cu, Fe, K, Magnes, Manganese, moly, Na, Nickel, Pb, Silicon, Zinc

## 4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?..... Yes No N/A  
 MS/MSD results acceptable?..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E)..... Yes No N/A  
 MS/MSD standards expired? (Levels D, E)..... Yes No N/A  
 LCS/BSS samples analyzed?..... Yes No N/A  
 LCS/BSS results acceptable?..... Yes No N/A  
 Standards traceable? (Levels D, E)..... Yes No N/A  
 Standards expired? (Levels D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Performance audit sample(s) analyzed?..... Yes No N/A  
 Performance audit sample results acceptable?..... Yes No N/A  
 Comments: MS Silicon - J Antimony - J NO PAS

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Duplicate results acceptable? ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards expired? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

Field duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐ *11/1/07*

Field split RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Transcription/calculation errors? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

Comments: Silica 48.4 J (48) Calcium - J (33)

~~R3/R4~~ - FB  
R3/R4

## 6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes ☒ No ☐ N/A ☐

ICP serial dilution %D values acceptable? ..... Yes ☒ No ☐ N/A ☐

ICP post digestion spike required? ..... Yes ☒ No ☐ N/A ☐

ICP post digestion spike values acceptable? ..... Yes ☒ No ☐ N/A ☐

Standards traceable? ..... Yes ☒ No ☐ N/A ☐

Standards expired? ..... Yes ☒ No ☐ N/A ☐

Transcription/calculation errors? ..... Yes ☒ No ☐ N/A ☐

Comments: \_\_\_\_\_



**INORGANIC ANALYSIS DATA VALIDATION CHECKLIST****7. FURNACE AA QUALITY CONTROL (Levels D and E)**

|   |     |    |     |
|---|-----|----|-----|
| Duplicate injections performed as required? ..... | Yes | No | N/A |
| Duplicate injection %RSD values acceptable? ..... | Yes | No | N/A |
| Analytical spikes performed as required? .....    | Yes | No | N/A |
| Analytical spike recoveries acceptable? .....     | Yes | No | N/A |
| Standards traceable? .....                        | Yes | No | N/A |
| Standards expired? .....                          | Yes | No | N/A |
| MSA performed as required? .....                  | Yes | No | N/A |
| MSA results acceptable? .....                     | Yes | No | N/A |
| Transcription/calculation errors? .....           | Yes | No | N/A |

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_**8. HOLDING TIMES (all levels)**

|  |                                      |    |     |
|--|--------------------------------------|----|-----|
| Samples properly preserved? .....      | <input checked="" type="radio"/> Yes | No | N/A |
| Sample holding times acceptable? ..... | <input checked="" type="radio"/> Yes | No | N/A |

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**INORGANIC ANALYSIS DATA VALIDATION CHECKLIST****9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses? ..... ☒ Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No ☒ N/A

Samples properly prepared? (Levels D, E) ..... Yes No ☒ N/A

Detection limits meet RDL? ..... ☒ Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No ☒ N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## **Appendix 6**

### **Additional Documentation Requested by Client**

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID     | ANALYTE           | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|-------------|-------------------|--------|-------|--------------------|--------------------|
| =====  | =====       | =====             | =====  | ===== | =====              | =====              |
| BLANK1 | 04L0644-MB1 | Silver, Total     | 0.09 u | MG/KG | 0.09               | 1.0                |
|        |             | Aluminum, Total   | 2.1    | MG/KG | 0.81               | 1.0                |
|        |             | Arsenic, Total    | 0.36 u | MG/KG | 0.36               | 1.0                |
|        |             | Boron, Total      | 0.68   | MG/KG | 0.51               | 1.0                |
|        |             | Barium, Total     | 0.06   | MG/KG | 0.02               | 1.0                |
|        |             | Beryllium, Total  | 0.01 u | MG/KG | 0.01               | 1.0                |
|        |             | Calcium, Total    | 2.6    | MG/KG | 0.69               | 1.0                |
|        |             | Cadmium, Total    | 0.03 u | MG/KG | 0.03               | 1.0                |
|        |             | Cobalt, Total     | 0.08 u | MG/KG | 0.08               | 1.0                |
|        |             | Chromium, Total   | 0.11   | MG/KG | 0.06               | 1.0                |
|        |             | Copper, Total     | 0.05 u | MG/KG | 0.05               | 1.0                |
|        |             | Iron, Total       | 2.3 u  | MG/KG | 2.3                | 1.0                |
|        |             | Potassium, Total  | 3.5 u  | MG/KG | 3.5                | 1.0                |
|        |             | Magnesium, Total  | 0.93   | MG/KG | 0.66               | 1.0                |
|        |             | Manganese, Total  | 0.02   | MG/KG | 0.01               | 1.0                |
|        |             | Molybdenum, Total | 0.16   | MG/KG | 0.13               | 1.0                |
|        |             | Sodium, Total     | 1.5    | MG/KG | 0.23               | 1.0                |
|        |             | Nickel, Total     | 0.12 u | MG/KG | 0.12               | 1.0                |
|        |             | Lead, Total       | 0.19 u | MG/KG | 0.19               | 1.0                |
|        |             | Antimony, Total   | 0.30 u | MG/KG | 0.30               | 1.0                |
|        |             | Selenium, Total   | 0.39 u | MG/KG | 0.39               | 1.0                |
|        |             | Silicon, Total    | 0.81   | MG/KG | 0.50               | 1.0                |
|        |             | Vanadium, Total   | 0.06 u | MG/KG | 0.06               | 1.0                |
|        |             | Zinc, Total       | 0.08   | MG/KG | 0.04               | 1.0                |
| BLANK1 | 04C0234-MB1 | Mercury, Total    | 0.02 u | MG/KG | 0.02               | 1.0                |

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## Lionville Laboratory, Inc.

## INORGANICS ACCURACY REPORT 10/26/04

CLIENT: TNU-HANFORD E03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE           | SPIKED<br>SAMPLE | INITIAL<br>RESULT | SPIKED<br>AMOUNT | %RECOV  | DILUTION<br>FACTOR (SPK) |
|--------|---------|-------------------|------------------|-------------------|------------------|---------|--------------------------|
| =====  | =====   | =====             | =====            | =====             | =====            | =====   | =====                    |
| -001   | J01XV2  | Silver, Total     | 4.5              | 0.08u             | 4.9              | 91.8    | 1.0                      |
|        |         | Aluminum, Total   | 5900             | 4980              | 196              | 469.8*  | 1.0                      |
|        |         | Arsenic, Total    | 179              | 2.6               | 196              | 90.1    | 1.0                      |
|        |         | Boron, Total      | 91.8             | 5.7               | 97.9             | 87.9    | 1.0                      |
|        |         | Barium, Total     | 279              | 100               | 196              | 91.4    | 1.0                      |
|        |         | Beryllium, Total  | 5.0              | 0.35              | 4.9              | 94.9    | 1.0                      |
|        |         | Calcium, Total    | 10400            | 13100             | 2450             | -110. * | 1.0                      |
|        |         | Cadmium, Total    | 4.7              | 0.21              | 4.9              | 91.7    | 1.0                      |
|        |         | Cobalt, Total     | 52.1             | 6.2               | 48.9             | 93.9    | 1.0                      |
|        |         | Chromium, Total   | 28.0             | 9.2               | 19.6             | 95.9    | 1.0                      |
|        |         | Copper, Total     | 41.1             | 16.9              | 24.5             | 98.8    | 1.0                      |
|        |         | Iron, Total       | 17600            | 16200             | 97.9             | 1412 *  | 1.0                      |
|        |         | Mercury, Total    | 0.97             | 0.88              | 0.16             | 59.0*   | 1.0                      |
|        |         | Potassium, Total  | 3240             | 882               | 2450             | 96.5    | 1.0                      |
|        |         | Magnesium, Total  | 6070             | 3650              | 2450             | 99.1    | 1.0                      |
|        |         | Manganese, Total  | 305              | 250               | 48.9             | 112.3*  | 1.0                      |
|        |         | Molybdenum, Total | 91.9             | 0.49              | 97.9             | 93.4    | 1.0                      |
|        |         | Sodium, Total     | 2560             | 244               | 2450             | 94.8    | 1.0                      |
|        |         | Nickel, Total     | 55.9             | 10.0              | 48.9             | 93.9    | 1.0                      |
|        |         | Lead, Total       | 64.4             | 13.8              | 48.9             | 103.5   | 1.0                      |
|        |         | Antimony, Total   | 28.6             | 0.27u             | 48.9             | 58.5    | 1.0                      |
|        |         | Selenium, Total   | 173              | 0.35u             | 196              | 88.6    | 1.0                      |
|        |         | Silicon, Total    | 405              | 343               | 97.9             | 64.0    | 1.0                      |
|        |         | Vanadium, Total   | 89.2             | 43.5              | 48.9             | 93.5    | 1.0                      |
|        |         | Zinc, Total       | 102              | 49.0              | 48.9             | 107.8   | 1.0                      |

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 10/26/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE  | SITE ID | ANALYTE           | INITIAL |           |       | DILUTION |
|---------|---------|-------------------|---------|-----------|-------|----------|
|         |         |                   | RESULT  | REPLICATE | RPD   |          |
| =====   | =====   | =====             | =====   | =====     | ===== | =====    |
| -001REP | J01XV2  | Silver, Total     | 0.08u   | 0.09u     | NC    | 1.0      |
|         |         | Aluminum, Total   | 4980    | 5440      | 8.9   | 1.0      |
|         |         | Arsenic, Total    | 2.6     | 2.4       | 8.0   | 1.0      |
|         |         | Boron, Total      | 5.7     | 3.6       | 45.2  | 1.0      |
|         |         | Barium, Total     | 100     | 92.4      | 8.1   | 1.0      |
|         |         | Beryllium, Total  | 0.35    | 0.38      | 9.4   | 1.0      |
|         |         | Calcium, Total    | 13100   | 9320      | 33.6  | 1.0      |
|         |         | Cadmium, Total    | 0.21    | 0.22      | 5.3   | 1.0      |
|         |         | Cobalt, Total     | 6.2     | 6.0       | 3.3   | 1.0      |
|         |         | Chromium, Total   | 9.2     | 10.6      | 14.1  | 1.0      |
|         |         | Copper, Total     | 16.9    | 15.9      | 6.1   | 1.0      |
|         |         | Iron, Total       | 16200   | 16700     | 3.2   | 1.0      |
|         |         | Mercury, Total    | 0.88    | 0.96      | 7.9   | 1.0      |
|         |         | Potassium, Total  | 882     | 985       | 11.0  | 1.0      |
|         |         | Magnesium, Total  | 3650    | 3470      | 4.9   | 1.0      |
|         |         | Manganese, Total  | 250     | 253       | 1.2   | 1.0      |
|         |         | Molybdenum, Total | 0.49    | 0.24      | 66.7  | 1.0      |
|         |         | Sodium, Total     | 244     | 214       | 13.4  | 1.0      |
|         |         | Nickel, Total     | 10.0    | 9.9       | 1.0   | 1.0      |
|         |         | Lead, Total       | 13.8    | 13.6      | 1.5   | 1.0      |
|         |         | Antimony, Total   | 0.27u   | 0.30u     | NC    | 1.0      |
|         |         | Selenium, Total   | 0.35u   | 0.40u     | NC    | 1.0      |
|         |         | Silicon, Total    | 343     | 209       | 48.4  | 1.0      |
|         |         | Vanadium, Total   | 43.5    | 43.8      | 0.69  | 1.0      |
|         |         | Zinc, Total       | 49.0    | 52.4      | 6.7   | 1.0      |

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 10/26/04

CLIENT: TNU-HANFORD E03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID     | ANALYTE         | SAMPLE | SPIKED<br>AMOUNT | SPIKED<br>UNITS | %RECOV |
|--------|-------------|-----------------|--------|------------------|-----------------|--------|
| =====  | =====       | =====           | =====  | =====            | =====           | =====  |
| LCS1   | 04L0644-LC1 | Silver, LCS     | 48.8   | 50.0             | MG/KG           | 97.6   |
|        |             | Aluminum, LCS   | 499    | 500              | MG/KG           | 99.7   |
|        |             | Arsenic, LCS    | 943    | 1000             | MG/KG           | 94.3   |
|        |             | Boron, LCS      | 480    | 500              | MG/KG           | 95.9   |
|        |             | Barium, LCS     | 497    | 500              | MG/KG           | 99.5   |
|        |             | Beryllium, LCS  | 24.6   | 25.0             | MG/KG           | 98.4   |
|        |             | Calcium, LCS    | 2490   | 2500             | MG/KG           | 99.5   |
|        |             | Cadmium, LCS    | 24.4   | 25.0             | MG/KG           | 97.6   |
|        |             | Cobalt, LCS     | 248    | 250              | MG/KG           | 99.0   |
|        |             | Chromium, LCS   | 49.9   | 50.0             | MG/KG           | 99.8   |
|        |             | Copper, LCS     | 124    | 125              | MG/KG           | 99.3   |
|        |             | Iron, LCS       | 498    | 500              | MG/KG           | 99.6   |
|        |             | Potassium, LCS  | 2520   | 2500             | MG/KG           | 100.9  |
|        |             | Magnesium, LCS  | 2440   | 2500             | MG/KG           | 97.7   |
|        |             | Manganese, LCS  | 75.8   | 75.0             | MG/KG           | 101.1  |
|        |             | Molybdenum, LCS | 498    | 500              | MG/KG           | 99.6   |
|        |             | Sodium, LCS     | 2450   | 2500             | MG/KG           | 98.0   |
|        |             | Nickel, LCS     | 198    | 200              | MG/KG           | 98.8   |
|        |             | Lead, LCS       | 247    | 250              | MG/KG           | 98.7   |
|        |             | Antimony, LCS   | 288    | 300              | MG/KG           | 95.9   |
|        |             | Selenium, LCS   | 907    | 1000             | MG/KG           | 90.7   |
|        |             | Silicon, LCS    | 401    | 500              | MG/KG           | 80.3   |
|        |             | Vanadium, LCS   | 244    | 250              | MG/KG           | 97.4   |
|        |             | Zinc, LCS       | 97.4   | 100              | MG/KG           | 97.4   |
| LCS1   | 04C0234-LC1 | Mercury, LCS    | 6.4    | 6.2              | MG/KG           | 102.7  |

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Date: 16 November 2004  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: Remaining Sites Confirmation Sampling - Soil - Waste Site 100-F-12  
Subject: PCB - Data Package No. H2776-LLI (SDG No. H2776)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2776-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Waste Site | Analysis   |
|-----------|-------------|-------|------------|------------|------------|
| J01XV2    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR3    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR4    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR5    | 10/11/04    | Soil  | C          | 100-F-12   | See Note 1 |

1 - PCBs by 8082.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

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If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank target compound results were acceptable.

#### Field Blanks

One field blank (J01XR5) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

#### Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 50% to 150% (laboratory CLP limits for chlorinated pesticides). If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to MS/MSD interference, all PCB results (except aroclor-1016) were qualified as estimates and flagged "J".

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All other accuracy spike results were acceptable.

#### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

- **Precision**

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to MS/MSD interference, all PCB results (except aroclor-1016) were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

#### Field Duplicate Samples

One set of field duplicates (J01XR3/J01XR4) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Remaining Waste Sites RQLs to ensure that laboratory detection levels meet the required criteria. Six PCB results were reported above the RQL. Under the BHI statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data Package No. H2776-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

Due to MS/MSD interference, all PCB results (except aroclor-1016) were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Six PCB results were reported above the RQL. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

## **Appendix 2**

### **Summary of Data Qualification**

**000007**

# PCB DATA QUALIFICATION SUMMARY\*

|                      |                  |                  |                           |
|----------------------|------------------|------------------|---------------------------|
| SDG: H2776           | REVIEWER:<br>TLI | DATE: 11/16/04   | PAGE <u>1</u> OF <u>1</u> |
| COMMENTS:            |                  |                  |                           |
| COMPOUND             | QUALIFIER        | SAMPLES AFFECTED | REASON                    |
| All but aroclor-1016 | J                | All              | MS/MSD<br>interference    |

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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## **Appendix 3**

### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**



|                                       |          |        |          |        |           |        |          |        |    |        |   |
|---------------------------------------|----------|--------|----------|--------|-----------|--------|----------|--------|----|--------|---|
| Project: BECHTEL-HANFORD              |          |        |          |        |           |        |          |        |    |        |   |
| Laboratory: Lionville Laboratory Inc. |          |        |          |        |           |        |          |        |    |        |   |
| Case: SDG: H2776                      |          |        |          |        |           |        |          |        |    |        |   |
| Sample Number                         | J01XV2   |        | J01XR3   |        | J01XR4    |        | J01XR5   |        |    |        |   |
| Remarks                               |          |        |          |        | Duplicate |        | E. Blank |        |    |        |   |
| Sample Date                           | 10/11/04 |        | 10/11/04 |        | 10/11/04  |        | 10/11/04 |        |    |        |   |
| Extraction Date                       | 10/15/04 |        | 10/15/04 |        | 10/15/04  |        | 10/15/04 |        |    |        |   |
| Analysis Date                         | 10/19/04 |        | 10/19/04 |        | 10/19/04  |        | 10/19/04 |        |    |        |   |
| PCB                                   | RQL      | Result | Q        | Result | Q         | Result | Q        | Result | Q  | Result | Q |
| Aroclor-1016                          | 20       | 140    | U        | 15     | U         | 15     | U        | 13     | U  |        |   |
| Aroclor-1221                          | 20       | 140    | UJ       | 15     | UJ        | 15     | UJ       | 13     | UJ |        |   |
| Aroclor-1232                          | 20       | 140    | UJ       | 15     | UJ        | 15     | UJ       | 13     | UJ |        |   |
| Aroclor-1242                          | 20       | 140    | UJ       | 15     | UJ        | 15     | UJ       | 13     | UJ |        |   |
| Aroclor-1248                          | 20       | 140    | UJ       | 15     | UJ        | 15     | UJ       | 13     | UJ |        |   |
| Aroclor-1254                          | 20       | 140    | UJ       | 15     | UJ        | 15     | UJ       | 13     | UJ |        |   |
| Aroclor-1260                          | 20       | 2400   | J        | 46     | J         | 55     | J        | 13     | UJ |        |   |

000010

## Lionville Laboratory, Inc.

PCBs by GC

Report Date: 10/29/04 15:41

RFW Batch Number: 0410L868

Client: TNUHANFORD B03-015 H2776 Work Order: 11343606001 Page: 1

|              | Cust ID:             | J01XV2          | J01XV2 | J01XV2  | J01XR3         | J01XR4         | J01XR5         |
|--------------|----------------------|-----------------|--------|---------|----------------|----------------|----------------|
| Sample       | RFW#:                | 001             | 001 MS | 001 MSD | 002            | 003            | 004            |
| Information  | Matrix:              | SOIL            | SOIL   | SOIL    | SOIL           | SOIL           | SOIL           |
|              | D.F.:                | 10.0            | 1.00   | 1.00    | 1.00           | 1.00           | 1.00           |
|              | Units:               | UG/KG           | UG/KG  | UG/KG   | UG/KG          | UG/KG          | UG/KG          |
| Surrogate:   | Tetrachloro-m-xylene | 85 %            | 91 %   | 96 %    | 97 %           | 95 %           | 92 %           |
|              | Decachlorobiphenyl   | 100 %           | 78 %   | 80 %    | 76 %           | 78 %           | 75 %           |
|              |                      | fl              | fl     | fl      | fl             | fl             | fl             |
| Aroclor-1016 |                      | 140 U <i>fl</i> | 76 %   | 81 %    | 15 U <i>fl</i> | 15 U <i>fl</i> | 13 U <i>fl</i> |
| Aroclor-1221 |                      | 140 U <i>J</i>  | 14 U   | 14 U    | 15 U <i>J</i>  | 15 U <i>J</i>  | 13 U <i>J</i>  |
| Aroclor-1232 |                      | 140 U <i>J</i>  | 14 U   | 14 U    | 15 U <i>J</i>  | 15 U <i>J</i>  | 13 U <i>J</i>  |
| Aroclor-1242 |                      | 140 U <i>J</i>  | 14 U   | 14 U    | 15 U <i>J</i>  | 15 U <i>J</i>  | 13 U <i>J</i>  |
| Aroclor-1248 |                      | 140 U <i>J</i>  | 14 U   | 14 U    | 15 U <i>J</i>  | 15 U <i>J</i>  | 13 U <i>J</i>  |
| Aroclor-1254 |                      | 140 U <i>J</i>  | 14 U   | 14 U    | 15 U <i>J</i>  | 15 U <i>J</i>  | 13 U <i>J</i>  |
| Aroclor-1260 |                      | 2400 <i>J</i>   | I %    | I %     | 46 <i>J</i>    | 55 <i>J</i>    | 13 U <i>J</i>  |

Cust ID: PBLKYL PBLKYL BS

Sample RFW#: 04LE1278-MB1 04LE1278-MB1

Information Matrix: SOIL SOIL

D.F.: 1.00 1.00

Units: UG/KG UG/KG

|              |                      |      |      |
|--------------|----------------------|------|------|
| Surrogate:   | Tetrachloro-m-xylene | 90 % | 92 % |
|              | Decachlorobiphenyl   | 95 % | 99 % |
|              |                      | fl   | fl   |
| Aroclor-1016 |                      | 13 U | 99 % |
| Aroclor-1221 |                      | 13 U | 13 U |
| Aroclor-1232 |                      | 13 U | 13 U |
| Aroclor-1242 |                      | 13 U | 13 U |
| Aroclor-1248 |                      | 13 U | 13 U |
| Aroclor-1254 |                      | 13 U | 13 U |
| Aroclor-1260 |                      | 13 U | 97 % |

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

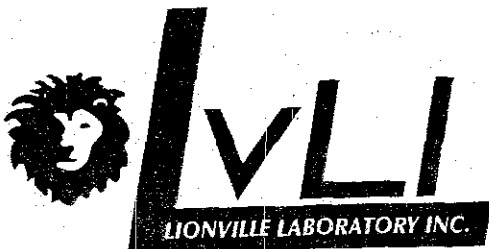
0000011

*jr*  
*11/16/04*

*fl*  
*11/16/04*

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**



## Analytical Report

Client: TNU HANFORD B03-015  
LVL#: 0410L868  
SDG/SAF#: H2776/B03-015

W.O.#: 11343-606-001-9999-00

Date Received: 10-13-2004

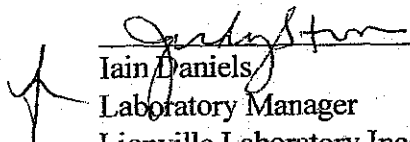
### PCB

Four (4) soil samples were collected on 10-11-2004.

The samples and their associated QC samples were extracted on 10-15-2004 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 10-19-28-2004. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. The samples and their associated QC samples received Silica Gel, Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3630C, 3660A and 3665A respectively.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recoveries were within acceptance criteria.
7. The obtainable matrix spike recoveries were within acceptance criteria.
8. Sample J01XV2 required a 10-fold dilution due to high concentration of target analytes.
9. All initial calibrations associated with this data set were within acceptance criteria.
10. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
11. Pattern for Aroclor-1260 was identified in the samples. The reported Aroclor was chosen based on the best pattern match and fit. Quantitation was performed using congeners common to the Aroclor to give the best overall total PCB concentration.
12. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

11/1/04  
Date

son\c:\group\data\pest\tnu hanford\0410-868.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

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00000002

|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|---|----------|---|-------------|---|---|--------------------------------------|---|--|---------------------|---------------------------|--|--|--|
| <b>Bechtel Hanford Inc.</b>   |          | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |             |   |   |                                      | <b>B03-015-262</b>  |  | Page 1 of 1         |                           |  |  |  |
| Collector<br>Stankovich/Rivera  |          | Company Contact<br>M Stankovich                 |             | Telephone No.<br>531-7620                   |   | Project Coordinator<br>KESSNER, JH   |   | Price Code <del>8B</del><br>8C   |                     | Data Turnaround<br>7 Days |  |  |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                               |          | Sampling Location<br>100-F-12                   |             | SAF No.<br>B03-015                          |   | Air Quality <input type="checkbox"/> |   | 15 Days  |                     | CKR 10/11/04              |  |  |  |
| Ice Chest No. <b>ERC 01 030</b>   |          | Field Logbook No.<br>EL 1578-3                  |             | COA<br>C10F126700                           |   | Method of Shipment<br>Fed Ex         |   |  |                     |                           |  |  |  |
| Shipped To <b>LVL</b><br><del>EDERLING SERVICES (Formerly TMA)</del>                            |          | Offsite Property No. <b>A050 013</b>            |             | Bill of Lading/Air Bill No. <b>SEE OSPC</b> |   |                                      |   |  |                     |                           |  |  |  |
| <b>POSSIBLE SAMPLE HAZARDS/REMARKS</b><br><br><b>Special Handling and/or Storage</b><br>Cool 4c |          |   |             | Preservation                                |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             | Type of Container                           |   | G/P                                  | G/P   | aG   | aG                  | G                         |  |  |  |
|   |          |   |             | No. of Container(s)                         |   | 1                                    | 1   | 1  | 1                   | 1                         |  |  |  |
|   |          |   |             | Volume                                      |   | 250mL                                | 120mL   | 250mL  | 250mL               | 250mL                     |  |  |  |
| <b>SAMPLE ANALYSIS</b><br><br>000014  |          |   |             | See item (1) in Special Instructions.       |   | Chromium Hex - 7196                  | PCBs - 8082: Pesticides - 8001: Chloro-Hydrocarbons - EPA8154<br>CKR 10/11/04 | PAHs - 8310  | TPH (Total) - 418.1 |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
| Sample No.  | Matrix * | Sample Date                                     | Sample Time |   |   |                                      |   |  |                     |                           |  |  |  |
| J01XV2  | SOIL     | 10/11/04  | 0920        | X   | X | X                                    | X   | X  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
| <b>CHAIN OF POSSESSION</b>  |          |   |             | <b>Sign/Print Names</b>                     |   |                                      |   | <b>SPECIAL INSTRUCTIONS</b>  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   | (1) ICP Metals - 6010TR (SW846) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV)<br><br>Personnel not available to relinquish samples from 3728 Ref # <u>2B</u> on <u>10/12/04</u> |                     |                           |  |  |  |
| Chris Rivera  |          | 10/11/04 1320                                   |             | 3728 Ref. 2B                                |   | 10/11/04 1320                        |   |  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   |  |                     |                           |  |  |  |
| REF 2B 3728   |          | 10/12/04 0900                                   |             | SIGALE                                      |   | 10/12/04 0900                        |   |  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   |  |                     |                           |  |  |  |
| SIGALE  |          | 10/12/04 0900                                   |             | FED EX                                      |   |                                      |   |  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   | <b>Matrix *</b><br>S=Soil<br>SE=Sediment<br>SO=Solid<br>SI=Sludge<br>W=Water<br>O=Oil<br>A=Air<br>DS=Drum Solids<br>DL=Drum Liquids<br>T=Tissue<br>WI=Wine<br>L=Liquid<br>V=Vegetation<br>X=Other  |                     |                           |  |  |  |
| F. DE   |          | 10-13-04 1005                                   |             | V. Hernandez                                |   | 10-13-04 1005                        |   |  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
| Relinquished By/Removed From  |          | Date/Time                                       |             | Received By/Stored In                       |   | Date/Time                            |   |  |                     |                           |  |  |  |
|   |          |   |             |   |   |                                      |   |  |                     |                           |  |  |  |
| <b>LABORATORY SECTION</b>   |          | Received By                                     |             | Title                                       |   |                                      |   | Date/Time  |                     |                           |  |  |  |
| <b>FINAL SAMPLE DISPOSITION</b>   |          | Disposal Method                                 |             | Disposed By                                 |   |                                      |   | Date/Time  |                     |                           |  |  |  |

| Bechtel Hanford Inc.   |  | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |  |  |                   |                                       |                   | B03-015-261  |  | Page 1 of 1  |  |                   |
|--|--|--|--|--|-------------------|---------------------------------------|-------------------|--|--|--|--|-------------------|
| Collector<br>Stankovich/Rivera                                       |  | Company Contact<br>M Stankovich          |  | Telephone No.<br>531-7620                      |                   | Project Coordinator<br>KESSNER, JH    |                   | Price Code<br><b>8B</b><br><b>8C</b>   |  | Data Turnaround<br><b>7 Days</b><br><b>15 Days</b>   |  |                   |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil    |  | Sampling Location<br>100-F-12            |  | SAF No.<br>B03-015                             |                   | Air Quality<br><b>11</b>              |                   |  |  |  |  |                   |
| Ice Chest No.<br><b>ERC 01 03 D</b>                                  |  | Field Logbook No.<br>EL 1578-3           |  | COA<br>C10FI26700                              |                   | Method of Shipment<br>Fed Ex          |                   | CRK  |  | 10/11/04   |  |                   |
| Shipped To<br><b>LVL</b><br><b>CEDARLINE SERVICES (Formerly TMA)</b> |  | Offsite Property No.<br><b>A050 013</b>  |  | Bill of Lading/Air Bill No.<br><b>SEE OSPC</b> |                   |                                       |                   |  |  |  |  |                   |
| Special Handling and/or Storage<br><b>Cool 4c</b>                    |  | Preservation                             |  |  |                   |                                       |                   |  |  |  |  |                   |
|  |  | Type of Container                        |  | G/P  | G/P               | G/P                                   | aG                | G  |  |  |  |                   |
|  |  | No. of Container(s)                      |  | 1  | 1                 | 1                                     | 1                 | 1  |  |  |  |                   |
|  |  | Volume                                   |  | 1000mL   | 250mL<br><b>B</b> | 120mL<br><b>D</b>                     | 250mL<br><b>A</b> | 60mL<br><b>AW 10/11/04</b>   |  |  |  |                   |
|  |  | SAMPLE ANALYSIS                          |  | See item (1) in Special Instructions.          |                   | See item (2) in Special Instructions. |                   | Chromium Hex - 7196  |  | PCBs - 8082:<br><del>Pesticides-</del><br><del>DDTs-Chloro-</del><br><del>Mercurides-</del><br><del>EPACIL-</del><br><b>CRK</b><br><b>10/11/04</b>                               |  | VOA - 8260A (TCL) |
| Sample No.   |  | Matrix *                                 |  | Sample Date                                    |                   | Sample Time                           |                   |  |  |  |  |                   |
| J01XR3   |  | SOIL                                     |  | 10/11/04                                       |                   | 1035                                  |                   | X  |  | X  |  |                   |
| J01XR4   |  | SOIL                                     |  | 10/11/04                                       |                   | 1035                                  |                   | X  |  | X  |  |                   |
| J01XR5   |  | SOIL                                     |  | 10/11/04                                       |                   | 1030                                  |                   | X  |  | X  |  |                   |
| CHAIN OF POSSESSION  |  | Sign/Print Names                         |  | SPECIAL INSTRUCTIONS                           |                   |                                       |                   |  |  | Matrix *   |  |                   |
| Relinquished By/Removed From<br><b>Chris Rivera</b>                  |  | Date/Time<br><b>10/11/04 1200</b>        |  | Received By/Stored In<br><b>3728 Ref. 2B</b>   |                   | Date/Time<br><b>10/11/04 1200</b>     |                   | (1) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec. Add-on {Americium-241; Americium-244; Gross Alpha & Gross Beta; Nickel-63; Isotopic Uranium [Plutonium-238, Plutonium-239/240]; Strontium-90, Total Enrichment-99; Isotopic Uranium [Uranium-233/234, Uranium-235, Uranium-238]; <b>MS 10/12/04</b> |  | S=Soil<br>SE=Sediment<br>SO=Solid<br>SI=Sludge<br>W=Water<br>O=Oil<br>A=Air<br>DS=Drain Solids<br>DL=DRAIN Liquids<br>T=Tissue<br>WI=Wipe<br>L=Liquid<br>V=Vegetation<br>X=Other |  |                   |
| Relinquished By/Removed From<br><b>REF 2B 3728</b>                   |  | Date/Time<br><b>10/12/04 0900</b>        |  | Received By/Stored In<br><b>SIGALE</b>         |                   | Date/Time<br><b>10/12/04 0900</b>     |                   | (2) ICP Metals - 6010TR (SW846) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV)   |  |  |  |                   |
| Relinquished By/Removed From<br><b>SIGALE</b>                        |  | Date/Time<br><b>10/12/04 0900</b>        |  | Received By/Stored In<br><b>FED EX</b>         |                   | Date/Time<br><b>10/12/04 0900</b>     |                   |  |  |  |  |                   |
| Relinquished By/Removed From<br><b>FED EX</b>                        |  | Date/Time<br><b>10-13-04 1005</b>        |  | Received By/Stored In<br><b>V. Xiong</b>       |                   | Date/Time<br><b>10-15-04 1005</b>     |                   | Personnel not available to relinquish samples from 3728<br>Ref # <b>2B</b> on <b>10/12/04</b>  |  |  |  |                   |
| Relinquished By/Removed From   |  | Date/Time                                |  | Received By/Stored In                          |                   | Date/Time                             |                   |  |  |  |  |                   |
| Relinquished By/Removed From   |  | Date/Time                                |  | Received By/Stored In                          |                   | Date/Time                             |                   |  |  |  |  |                   |
| LABORATORY SECTION   |  | Received By                              |  | Title  |                   | Date/Time                             |                   |  |  |  |  |                   |
| FINAL SAMPLE DISPOSITION   |  | Disposal Method                          |  | Disposed By                                    |                   | Date/Time                             |                   |  |  |  |  |                   |

## **Appendix 5**

### **Data Validation Supporting Documentation**

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

|                                    |                    |                    |                            |                       |   |
|------------------------------------|--------------------|--------------------|----------------------------|-----------------------|---|
| VALIDATION LEVEL:                  | A                  | B                  | <u>C</u>                   | D                     | E |
| PROJECT: <u>RWS 100-F-12</u>       |                    |                    | DATA PACKAGE: <u>H2776</u> |                       |   |
| VALIDATOR: <u>TLP</u>              |                    | LAB: <u>LLI</u>    |                            | DATE: <u>11/12/04</u> |   |
|                                    |                    |                    | SDG: <u>H2776</u>          |                       |   |
| ANALYSES PERFORMED                 |                    |                    |                            |                       |   |
| SW-846 8081                        | SW-846 8081 (TCLP) | <u>SW-846 8082</u> | SW-846 8081 (TCLP)         |                       |   |
| SAMPLES/MATRIX                     |                    |                    |                            |                       |   |
| <u>JOIXU2 JOIXK3 JOIXR4 JOIXRS</u> |                    |                    |                            |                       |   |
|                                    |                    |                    |                            |                       |   |
|                                    |                    |                    |                            |                       |   |
|                                    |                    |                    |                            |                       |   |
| <u>Soil</u>                        |                    |                    |                            |                       |   |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? ..... Yes No N/AContinuing calibrations acceptable? ..... Yes No N/AStandards traceable? ..... Yes No N/AStandards expired? ..... Yes No N/ACalculation check acceptable? ..... Yes No N/ADDT and endrin breakdowns acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## PESTICIDE/PCB DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)..... Yes No N/A  
 Calibration blank results acceptable? (Levels D, E)..... Yes No N/A  
 Laboratory blanks analyzed?..... Yes No N/A  
 Laboratory blank results acceptable?..... Yes No N/A  
 Field/trip blanks analyzed? (Levels C, D, E)..... Yes No N/A  
 Field/trip blank results acceptable? (Levels C, D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

FB-RS

## 4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?..... Yes No N/A  
 Surrogate recoveries acceptable?..... Yes No N/A  
 Surrogates traceable? (Levels D, E)..... Yes No N/A  
 Surrogates expired? (Levels D, E)..... Yes No N/A  
 MS/MSD samples analyzed?..... Yes No N/A  
 MS/MSD results acceptable?..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E)..... Yes No N/A  
 MS/MSD standards expired? (Levels D, E)..... Yes No N/A  
 LCS/BSS samples analyzed?..... Yes No N/A  
 LCS/BSS results acceptable?..... Yes No N/A  
 Standards traceable? (Levels D, E)..... Yes No N/A  
 Standards expired? (Levels D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Performance audit sample(s) analyzed?..... Yes No N/A  
 Performance audit sample results acceptable?..... Yes No N/A  
 Comments: MS/MSD Aroclor 1260 - Interference - I all but 1016  
 \_\_\_\_\_  
 \_\_\_\_\_

NO PAS

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/ADuplicate results acceptable? ..... Yes No N/AMS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/AMS/MSD standards expired? (Levels D, E) ..... Yes No N/AField duplicate RPD values acceptable? ..... Yes No N/AField split RPD values acceptable? ..... Yes No N/ATranscription/calculation errors? (Levels D, E) ..... Yes No N/AComments: 1260 MS/MSD Interfere - Tall hat 10/16

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## 6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No N/APositive results resolved acceptably? ..... Yes No N/AComments: 

---

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---

---

## 7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/ASample holding times acceptable? ..... Yes No N/AComments: 

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---

---

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

## 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: V2 - all undetect over

## 9. SAMPLE CLEANUP (Levels D and E)

Fluorilicil ® (or other absorbent) cleanup performed? ..... Yes No N/A

Lot check performed? ..... Yes No N/A

Check recoveries acceptable? ..... Yes No N/A

GPC cleanup performed? ..... Yes No N/A

GPC check performed? ..... Yes No N/A

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments: \_\_\_\_\_

Date: 16 November 2004  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: Remaining Sites Confirmation Sampling - Soil - Waste Site 100-F-12  
Subject: Wet Chemistry - Data Package No. H2776-LLI (SDG No. H2776)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H2776-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Waste Site | Analysis       |
|-----------|-------------|-------|------------|------------|----------------|
| J01XV2    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 & 2 |
| J01XR3    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1     |
| J01XR4    | 10/11/04    | Soil  | C          | 100-F-12   | See Note 1     |

1 - Chromium VI by 7196A.

2 - Total petroleum hydrocarbons by 9071.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## **DATA QUALITY PARAMETERS**

- Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for TPH and 30 days for chromium VI.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and

**000001**

"UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blanks**

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in

000002

the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (41%), all TPH results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

#### Field Duplicate

One set of field duplicates (J01XR3/J01XR4) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All undetected results exceeded the RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2776-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### MAJOR DEFICIENCIES

None found.

#### MINOR DEFICIENCIES

Due to an RPD outside QC limits (41%), all TPH results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

000003

All undetected results exceeded the RQL. Under the BHI statement of work, no qualification is required.

#### **REFERENCES**

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**



Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

## **Appendix 2**

### **Summary of Data Qualification**

**000007**

# WET CHEMISTRY DATA QUALIFICATION SUMMARY\*

|            |                  |                  |                           |
|------------|------------------|------------------|---------------------------|
| SDG: H2776 | REVIEWER:<br>TLI | DATE: 11/16/04   | PAGE <u>1</u> OF <u>1</u> |
| COMMENTS:  |                  |                  |                           |
| COMPOUND   | QUALIFIER        | SAMPLES AFFECTED | REASON                    |
| TPH        | J                | J01XV2           | RPD                       |

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**

|                          |  |            |        |          |        |          |        |   |        |   |
|--------------------------|--|------------|--------|----------|--------|----------|--------|---|--------|---|
| Project: BECHTEL-HANFORD |  |            |        |          |        |          |        |   |        |   |
| Laboratory: LLI          |  |            |        |          |        |          |        |   |        |   |
| Case                     |  | SDG: H2776 |        |          |        |          |        |   |        |   |
| Sample Number            |  | J01XV2     |        | J01XR3   |        | J01XR4   |        |   |        |   |
| Remarks                  |  |            |        |          |        |          |        |   |        |   |
| Sample Date              |  | 10/11/04   |        | 10/11/04 |        | 10/11/04 |        |   |        |   |
| Wet Chemistry            |  | RQL        | Result | Q        | Result | Q        | Result | Q | Result | Q |
| TPH                      |  | 5          | 1670   | J        | NA     |          | NA     |   |        |   |
| Chromium VI              |  | 0.1        | 0.26   |          | 0.22   | U        | 0.22   | U |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
| NA = Not analyzed        |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |
|                          |  |            |        |          |        |          |        |   |        |   |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 10/19/04

CLIENT: TNJ-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

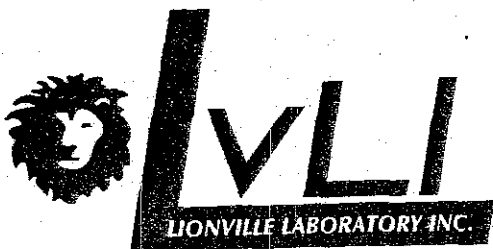
| SAMPLE | SITE ID | ANALYTE                | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|------------------------|--------|-------|--------------------|--------------------|
| -001   | J01XV2  | % Solids               | 94.6   | %     | 0.01               | 1.0                |
|        |         | Chromium VI            | 0.26   | MG/KG | 0.21               | 1.0                |
|        |         | Petroleum Hydrocarbons | 1670 J | MG/KG | 877                | 25.0               |
| -002   | J01XR3  | % Solids               | 90.6   | %     | 0.01               | 1.0                |
|        |         | Chromium VI            | 0.22 u | MG/KG | 0.22               | 1.0                |
| -003   | J01XR4  | % Solids               | 90.8   | %     | 0.01               | 1.0                |
|        |         | Chromium VI            | 0.22 u | MG/KG | 0.22               | 1.0                |
| -004   | J01XR5  | % Solids               | 99.9   | %     | 0.01               | 1.0                |

*ju*  
11/16/04

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## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**



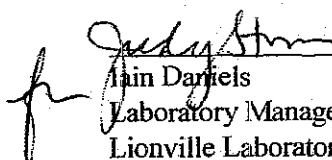
## Analytical Report

Client: TNU-HANFORD B03-015 H 2776  
LVL#: 0410L868 H2776

W.O.#: 11343-606-001-9999-00  
Date Received: 10-13-04

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 4 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The results presented in this report are derived from samples that met LVL's sample acceptance policy.
5. The method blanks for Chromium VI and Petroleum Hydrocarbons (PHC) were within the method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI and PHC were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits, however matrix spike recovery for PHC was above the control limit that may be attributed to the high background concentration of the target analyte and the low spike level concentration.
8. The replicate analysis Chromium VI was within the 20% Relative Percent Difference (RPD) control limit, however replicate analysis for PHC was outside the control limits that may be attributed to sample inhomogeneity.
9. Results for solid samples are reported on a dry weight basis.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness; other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

  
John Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

10/29/04  
Date

njl010-868

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

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|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
|---|--|---|--|---|--|--------------------------------------|--|--|---------------------|--------------------------------------|---|--|
| <b>Bechtel Hanford Inc.</b>   |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |   |  |                                      | <b>B03-015-262</b>   |  | Page 1 of 1         |                                      |   |  |
| Collector<br>Stankovich/Rivera  |  | Company Contact<br>M Stankovich                 |  | Telephone No.<br>531-7620                   |  | Project Coordinator<br>KESSNER, JH   |  | Price Code <del>8B</del><br>8C   |                     | Data Turnaround<br>7 Days<br>15 Days |   |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                               |  | Sampling Location<br>100-F-12                   |  | SAF No.<br>B03-015                          |  | Air Quality <input type="checkbox"/> |  |  |                     | CR 10/11/04                          |   |  |
| Ice Chest No. <b>ERC 01 030</b>   |  | Field Logbook No.<br>EL 1578-3                  |  | COA<br>C10F126700                           |  | Method of Shipment<br>Fed Ex         |  |  |                     |                                      |   |  |
| Shipped To <b>LVL</b><br><del>BERLING SERVICES (Formerly TMA)</del>                             |  | Offsite Property No. <b>A050 013</b>            |  | Bill of Lading/Air Bill No. <b>SEE OSPC</b> |  |                                      |  |  |                     |                                      |   |  |
| <b>POSSIBLE SAMPLE HAZARDS/REMARKS</b><br><br><b>Special Handling and/or Storage</b><br>Cool 4c |  |   |  | Preservation                                |  |                                      |  |  |                     |                                      |   |  |
|   |  |   |  | Type of Container                           |  | G/P                                  | G/P  | aG   | aG                  | G                                    |   |  |
|   |  |   |  | No. of Container(s)                         |  | 1                                    | 1  | 1  | 1                   | 1                                    |   |  |
|   |  |   |  | Volume                                      |  | 250ml<br><b>10-13-04 8</b>           | 120ml<br><b>0</b>  | 250ml<br><b>A</b>  | 250ml<br><b>D</b>   | 250ml<br><b>E</b>                    |   |  |
| <b>SAMPLE ANALYSIS</b>  |  |   |  | See item (1) in Special Instructions.       |  | Chromium Hex - 71%                   | PCBs - 8082;<br><del>Pesticides</del><br><del>9081-Chloro</del><br><del>Hydrocarbons</del><br><del>EDS</del><br><b>CR 10/11/04</b> | PAHs - 8310  | TPH (Total) - 418.1 |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
| Sample No.  |  | Matrix *  |  | Sample Date                                 |  | Sample Time                          |  |  |                     |                                      |   |  |
| J01XV2  |  | SOIL  |  | 10/11/04                                    |  | 0920                                 |  | X  | X                   | X                                    | X |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
| <b>CHAIN OF POSSESSION</b>  |  |   |  | <b>Sign/Print Names</b>                     |  |                                      |  | <b>SPECIAL INSTRUCTIONS</b>  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  | (1) ICP Metals - 6010TR (SW846) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV)<br><br>Personnel not available to relinquish samples from 3728 Ref # <b>2B</b> on <b>10/12/04</b> |                     |                                      |   |  |
| Chris Rivera  |  | 10/11/04 1320                                   |  | 3728 Ref. 2B                                |  | 10/11/04 1320                        |  |  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  |  |                     |                                      |   |  |
| REF 2B 3728   |  | 10/12/04 0900                                   |  | SIGALE                                      |  | 10/12/04 0900                        |  |  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  |  |                     |                                      |   |  |
| SIGALE  |  | 10/12/04 0900                                   |  | FED EX                                      |  |                                      |  |  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  | <b>Matrix *</b><br>S=Soil<br>SE=Sediment<br>SO=Solid<br>SL=Sludge<br>W=Water<br>O=Oil<br>A=Air<br>DS=Drum Solids<br>DL=Drum Liquids<br>T=Tissue<br>WI=Wipe<br>L=Liquid<br>V=Vegetation<br>X=Other  |                     |                                      |   |  |
| F. J. E.  |  | 10-13-04 1005                                   |  | F. J. E.                                    |  | 10-13-04 1005                        |  |  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
| Relinquished By/Removed From  |  | Date/Time                                       |  | Received By/Stored In                       |  | Date/Time                            |  |  |                     |                                      |   |  |
|   |  |   |  |   |  |                                      |  |  |                     |                                      |   |  |
| <b>LABORATORY SECTION</b>   |  | Received By                                     |  | Title                                       |  |                                      |  | Date/Time  |                     |                                      |   |  |
| <b>FINAL SAMPLE DISPOSITION</b>   |  | Disposal Method                                 |  | Disposed By                                 |  |                                      |  | Date/Time  |                     |                                      |   |  |

| Bechtel Hanford Inc.   |          | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |   |  |                                   |   |   | B03-015-261                           | Page 1 of 1   |
|--|----------|--|---|--|-----------------------------------|---|---|---------------------------------------|---|
| Collector<br>Stankovich/Rivera   |          | Company Contact<br>M Stankovich          |   | Telephone No.<br>531-7620                      |                                   | Project Coordinator<br>KESSNER, JH  |   | Price Code <del>B0</del><br><b>8C</b> | Data Turnaround<br><b>7 Days</b><br><b>15 Days</b>  |
| Protect Designation<br>Remaining Sites Confirmation Sampling-Soil                        |          | Sampling Location<br>100-F-12            |   | SAF No.<br>B03-015                             |                                   | Air Quality<br><b>11</b>  |   | <b>CRK</b> <b>10/11/04</b>            |   |
| Ice Chest No.<br><b>ERC 01 03 0</b>  |          | Field Logbook No.<br>EL 1578-3           |   | COA<br>C10P126700                              |                                   | Method of Shipment<br>Fed Ex  |   |                                       |   |
| Shipped To<br><b>LVL</b><br><b>EDLINE SERVICES (Formerly TMA)</b>                        |          | Offsite Property No.<br><b>A050 013</b>  |   | Bill of Lading/Air Bill No.<br><b>SEE OSPC</b> |                                   |   |   |                                       |   |
| POSSIBLE SAMPLE HAZARDS/REMARKS<br><br>Special Handling and/or Storage<br><b>Cool 4c</b> |          | Preservation                             |   |  |                                   |   |   |                                       |   |
|  |          | Type of Container                        | G/P                                     | G/P  | G/P                               | nG  | G   |                                       |   |
|  |          | No. of Container(s)                      | 1                                       | 1  | 1                                 | 1   | 1   |                                       |   |
|  |          | Volume                                   | 1000mL                                  | 250mL<br><b>B</b>                              | 120mL<br><b>C</b>                 | 250mL<br><b>A</b>   | 60mL<br><b>Am 100</b>   |                                       |   |
|  |          |  | See item (1) in Special Instructions.   | See item (2) in Special Instructions.          | Chromium Hex - 7196               | PCEs - 8062;<br>Perchlorates -<br>SO <sub>2</sub> /Chloro-<br>Hydrocarbons -<br>EPRI 151<br><b>CRK</b><br><b>10/11/04</b> | VOA - 8260A (TCL)   |                                       |   |
| SAMPLE ANALYSIS  |          |  |   |  |                                   |   |   |                                       |   |
| Sample No.   | Matrix * | Sample Date                              | Sample Time                             |  |                                   |   |   |                                       |   |
| J01XR3   | SOIL     | 10/11/04                                 | 1035                                    | X  | X                                 | X   | X   |                                       |   |
| J01XR4   | SOIL     | 10/11/04                                 | 1035                                    | X  | X                                 | X   | X   |                                       |   |
| J01XR5   | SOIL     | 10/11/04                                 | 1030                                    |  | X                                 |   | *   |                                       |   |
| CHAIN OF POSSESSION:   |          |  |   | Sign/Print Names                               |                                   |   |   | SPECIAL INSTRUCTIONS                  |   |
| Relinquished By/Removed From<br><b>Chris Rivera</b>                                      |          | Date/Time<br><b>10/11/04 1200</b>        | Received By/Stored In<br><b>Ref. 2B</b> |  | Date/Time<br><b>10/11/04 1200</b> |   | (1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241; Americium-244; Gross Alpha & Gross Beta; Nickel-63; Isotopic Plutonium (Plutonium-238, Plutonium-239/240); Strontium-90, Total Sr; Technetium-99; Isotopic Uranium (Uranium-232/234, Uranium-235, Uranium-238); DPs 10/20/04 |                                       | Matrix *<br>S=Soil<br>SE=Sediment<br>SU=Solid<br>SL=Sludge<br>W = Water<br>O=Oil<br>A=Air<br>DS=Drain Solids<br>OL=Organic Liquid<br>T=Tissue<br>WT=Wipe<br>L=Liquid<br>V=Vegetation<br>X=Other |
| Relinquished By/Removed From<br><b>REF 2B 3728</b>                                       |          | Date/Time<br><b>10/12/04 0900</b>        | Received By/Stored In<br><b>SJGALE</b>  |  | Date/Time<br><b>10/12/04 0900</b> |   | (2) ICP Metals - 6010TR (SW846) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV)  |                                       |   |
| Relinquished By/Removed From<br><b>SJGALE</b>  |          | Date/Time<br><b>10/12/04 0900</b>        | Received By/Stored In<br><b>FED EX</b>  |  | Date/Time<br><b>10/12/04 0900</b> |   | Personnel not available to relinquish samples from 3728 Ref # <b>2B</b> on <b>10/12/04</b>  |                                       |   |
| Relinquished By/Removed From<br><b>FEDEX</b>   |          | Date/Time<br><b>10-13-04 1005</b>        | Received By/Stored In<br><b>K. King</b> |  | Date/Time<br><b>10-13-04 1005</b> |   |   |                                       |   |
| Relinquished By/Removed From   |          | Date/Time                                | Received By/Stored In                   |  | Date/Time                         |   |   |                                       |   |
| LABORATORY SECTION   |          | Received By                              |   | Title  |                                   | Date/Time   |   |                                       |   |
| FINAL SAMPLE DISPOSITION   |          | Disposal Method                          |   | Disposed By                                    |                                   | Date/Time   |   |                                       |   |

## **Appendix 5**

### **Data Validation Supporting Documentation**

## GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

|                              |         |                 |                            |                       |                                  |
|------------------------------|---------|-----------------|----------------------------|-----------------------|----------------------------------|
| VALIDATION LEVEL:            | A       | B               | <b>C</b>                   | D                     | E                                |
| PROJECT: <i>Rws 100-F-12</i> |         |                 | DATA PACKAGE: <i>H2776</i> |                       |                                  |
| VALIDATOR: <i>TLI</i>        |         | LAB: <i>LLI</i> |                            | DATE: <i>11/12/09</i> |                                  |
|                              |         |                 | SDG: <i>H2776</i>          |                       |                                  |
| ANALYSES PERFORMED           |         |                 |                            |                       |                                  |
| Anions/IC                    | TOC     | TOX             | TPH-418.1                  | Oil and Grease        | Alkalinity                       |
| Ammonia                      | BOD/COD | Chloride        | <b>Chromium-VI</b>         | pH                    | NO <sub>3</sub> /NO <sub>2</sub> |
| Sulfate                      | TDS     | TKN             | Phosphate                  | <b>TOT</b>            |                                  |
|                              |         |                 |                            |                       |                                  |
| SAMPLES/MATRIX               |         |                 |                            |                       |                                  |
| <i>JO1XV2 JO1XR3 JO1XR4</i>  |         |                 |                            |                       |                                  |
|                              |         |                 |                            |                       |                                  |
|                              |         |                 |                            |                       |                                  |
|                              |         |                 |                            |                       |                                  |
| <i>Soil</i>                  |         |                 |                            |                       |                                  |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No **N/A**Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## 2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No **N/A**Initial calibrations acceptable? ..... Yes No **N/A**ICV and CCV checks performed on all instruments? ..... Yes No **N/A**ICV and CCV checks acceptable? ..... Yes No **N/A**Standards traceable? ..... Yes No **N/A**Standards expired? ..... Yes No **N/A**Calculation check acceptable? ..... Yes No **N/A**Comments: \_\_\_\_\_  
 \_\_\_\_\_

## GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

## 3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A  
 ICB and CCB results acceptable? (Levels D, E)..... Yes No N/A  
 Laboratory blanks analyzed?..... Yes No N/A  
 Laboratory blank results acceptable?..... Yes No N/A  
 Field blanks analyzed? (Levels C, D, E)..... Yes No N/A  
 Field blank results acceptable? (Levels C, D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Comments: NO FB

## 4. ACCURACY (Levels C, D, and E)

Spike samples analyzed?..... Yes No N/A  
 Spike recoveries acceptable?..... Yes No N/A  
 Spike standards NIST traceable? (Levels D, E)..... Yes No N/A  
 Spike standards expired? (Levels D, E)..... Yes No N/A  
 LCS/BSS samples analyzed?..... Yes No N/A  
 LCS/BSS results acceptable?..... Yes No N/A  
 Standards traceable? (Levels D, E)..... Yes No N/A  
 Standards expired? (Levels D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Performance audit sample(s) analyzed?..... Yes No N/A  
 Performance audit sample results acceptable?..... Yes No N/A  
 Comments: MS 744 = 303 - Jall 1/1/2/2

NO P4

**GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS****5. PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Duplicate results acceptable? ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards expired? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

Field duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Field split RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Transcription/calculation errors? (Levels D, E) ..... Yes ☒ No ☐ N/A ☐

Comments:

TPH - 4170 - Tall

FD R3/R4

**6. HOLDING TIMES (all levels)**

Samples properly preserved? ..... Yes ☒ No ☐ N/A ☐

Sample holding times acceptable? ..... Yes ☒ No ☐ N/A ☐

Comments:

## GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

## 7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... ☒ Yes No ☐ N/A

Results supported in the raw data? (Levels D, E) ..... Yes No ☒ N/A

Samples properly prepared? (Levels D, E) ..... Yes No ☒ N/A

Detection limits meet RDL? ..... Yes ☒ No ☐ N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No ☒ N/A

Comments: all CR VI over

\_\_\_\_\_

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## **Appendix 6**

### **Additional Documentation Requested by Client**

**000021**



Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/19/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE  | SITE ID      | ANALYTE                | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|---------|--------------|------------------------|--------|-------|--------------------|--------------------|
| BLANK10 | 04LVI033-MB1 | Chromium VI            | 0.20 u | MG/KG | 0.20               | 1.0                |
| BLANK10 | 04LHC048-MB1 | Petroleum Hydrocarbons | 33.3 u | MG/KG | 33.3               | 1.0                |

000022

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 10/19/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE  | SITE ID      | ANALYTE                | SPIKED<br>SAMPLE | INITIAL<br>RESULT | SPIKED<br>AMOUNT | %RECOV | DILUTION<br>FACTOR (SPK) |
|---------|--------------|------------------------|------------------|-------------------|------------------|--------|--------------------------|
| -001    | J01XV2       | Petroleum Hydrocarbons | 2120             | 1670              | 147              | 303.4* | 25.0                     |
| -002    | J01XR3       | Soluble Chromium VI    | 4.6              | 0.22u             | 4.4              | 105.9  | 1.0                      |
|         |              | Insoluble Chromium VI  | 1490             | 0.22u             | 1430             | 104.0  | 100                      |
| BLANK10 | 04LVI033-MB1 | Soluble Chromium VI    | 3.9              | 0.20u             | 4.0              | 98.7   | 1.0                      |
|         |              | Insoluble Chromium VI  | 1230             | 0.20u             | 1200             | 101.9  | 100                      |
| LCS10   | 04LHC048-LC1 | Petroleum Hydrocarbons | 134              | 33.3 u            | 140              | 95.7   | 1.0                      |

000023

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 10/19/04

CLIENT: TNU-HANFORD B03-015

LVL LOT #: 0410L868

WORK ORDER: 11343-606-001-9999-00

| SAMPLE  | SITE ID | ANALYTE                | INITIAL<br>RESULT | REPLICATE | RPD  | DILUTION<br>FACTOR (REP) |
|---------|---------|------------------------|-------------------|-----------|------|--------------------------|
| -001REP | J01XV2  | Petroleum Hydrocarbons | 1670              | 2540      | 41.3 | 25.0                     |
| -002REP | J01XR3  | Chromium VI            | 0.22u             | 0.22u     | NC   | 1.0                      |

000024

Date: 16 November 2004  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: Remaining Sites Confirmation Sampling - Soil - Waste Site 100-F-12  
Subject: PAH - Data Package No. H2776-LLI (SDG No. H2776)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H2776-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Waste Site | Analysis   |
|-----------|-------------|-------|------------|------------|------------|
| J01XV2    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |

1- Polyaromatic hydrocarbons (PAH) by 8310C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the

000001

limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

#### Field Blanks

No field blank was submitted for analysis.

- **Accuracy**

#### Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the MS and MSD being diluted out, all PAH results were qualified as estimates and flagged "J".

000002

All other accuracy results were acceptable.

#### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to the surrogate being diluted out, all PAH results were qualified as estimates and flagged "J".

- **Precision**

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample.

Samples results must be within RPD limits of  $\pm 30\%$ . If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the MS and MSD being diluted out, all PAH results were qualified as estimates and flagged "J".

#### Field Duplicate Samples

No field duplicates were submitted for analysis.

000003

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Three analytes exceeded the RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2776-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

Due to the MS and MSD being diluted out, all PAH results were qualified as estimates and flagged "J". Due to the surrogate being diluted out, all PAH results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Three analytes exceeded the RQL in all samples. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

**000005**



Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

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## **Appendix 2**

### **Summary of Data Qualification**

**000007**

# PAH DATA QUALIFICATION SUMMARY\*

|            |                  |                  |                           |
|------------|------------------|------------------|---------------------------|
| SDG: H2776 | REVIEWER:<br>TLI | DATE: 11/16/04   | PAGE <u>1</u> OF <u>1</u> |
| COMMENTS:  |                  |                  |                           |
| COMPOUND   | QUALIFIER        | SAMPLES AFFECTED | REASON                    |
| All        | J                | All              | MS/MSD diluted out        |
| All        | J                | All              | Surrogate diluted out     |

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

## **Appendix 3**

### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**

|                                       |     |            |    |        |   |        |   |        |   |        |   |  |
|---------------------------------------|-----|------------|----|--------|---|--------|---|--------|---|--------|---|--|
| Project: BECHTEL-HANFORD              |     |            |    |        |   |        |   |        |   |        |   |  |
| Laboratory: Lionville Laboratory Inc. |     |            |    |        |   |        |   |        |   |        |   |  |
| Case:                                 |     | SDG: H2776 |    |        |   |        |   |        |   |        |   |  |
| Sample Number                         |     | J01XV2     |    |        |   |        |   |        |   |        |   |  |
| Remarks                               |     |            |    |        |   |        |   |        |   |        |   |  |
| Sample Date                           |     | 10/11/04   |    |        |   |        |   |        |   |        |   |  |
| Extraction Date                       |     | 10/20/04   |    |        |   |        |   |        |   |        |   |  |
| Analysis Date                         |     | 10/26/04   |    |        |   |        |   |        |   |        |   |  |
| PAH (8310)                            | MDL | Result     | Q  | Result | Q | Result | Q | Result | Q | Result | Q |  |
| Napthalene                            | 15  | 1060       | UJ |        |   |        |   |        |   |        |   |  |
| Acenaphthylene                        | 15  | 1060       | UJ |        |   |        |   |        |   |        |   |  |
| Acenaphthene                          | 15  | 1060       | UJ |        |   |        |   |        |   |        |   |  |
| Fluorene                              | 15  | 350        | J  |        |   |        |   |        |   |        |   |  |
| Phenanthrene                          | 15  | 3000       | J  |        |   |        |   |        |   |        |   |  |
| Anthracene                            | 15  | 590        | J  |        |   |        |   |        |   |        |   |  |
| Fluoranthene                          | 15  | 6900       | J  |        |   |        |   |        |   |        |   |  |
| Pyrene                                | 15  | 5800       | J  |        |   |        |   |        |   |        |   |  |
| Benzo(a)anthracene                    | 15  | 2600       | J  |        |   |        |   |        |   |        |   |  |
| Chrysene                              | 15  | 3300       | J  |        |   |        |   |        |   |        |   |  |
| Benzo(b)fluoranthrene                 | 15  | 2700       | J  |        |   |        |   |        |   |        |   |  |
| Benzo(k)fluoranthrene                 | 15  | 1100       | J  |        |   |        |   |        |   |        |   |  |
| Benzo(a)pyrene                        | 15  | 2300       | J  |        |   |        |   |        |   |        |   |  |
| Dibenzo(a,h)anthracene                | 15  | 360        | J  |        |   |        |   |        |   |        |   |  |
| Benzo(ghi)perylene                    | 15  | 1100       | J  |        |   |        |   |        |   |        |   |  |
| Indeno(1,2,3-cd)pyrene                | 15  | 1000       | J  |        |   |        |   |        |   |        |   |  |

000010

| Cust ID:            | J01XV2 | J01XV2 | J01XV2  | BLK          | BLK BS       |
|---------------------|--------|--------|---------|--------------|--------------|
| Sample RFW#:        | 001    | 001 MS | 001 MSD | 04LE1291-MB1 | 04LE1291-MB1 |
| Information Matrix: | SOIL   | SOIL   | SOIL    | SOIL         | SOIL         |
| D.F.:               | 10.0   | 10.0   | 10.0    | 1.00         | 1.00         |
| Units:              | ug/kg  | ug/kg  | ug/kg   | ug/kg        | ug/kg        |

| Triphenylene               | D    | % | D | % | D | % | 120 | %    | 113 | %   |   |
|----------------------------|------|---|---|---|---|---|-----|------|-----|-----|---|
| =====fl=====               |      |   |   |   |   |   |     |      |     |     |   |
| Naphthalene                | 1060 | U | J | D | % | D | %   | 100  | U   | 94  | % |
| Acenaphthylene             | 1060 | U |   | D | % | D | %   | 100  | U   | 90  | % |
| Acenaphthene               | 1060 | U |   | D | % | D | %   | 100  | U   | 106 | % |
| Fluorene                   | 350  |   |   | D | % | D | %   | 5.00 | U   | 110 | % |
| Phenanthrene               | 3000 |   |   | D | % | D | %   | 5.00 | U   | 110 | % |
| Anthracene                 | 590  |   |   | D | % | D | %   | 5.00 | U   | 116 | % |
| Fluoranthene               | 6900 |   |   | D | % | D | %   | 10.0 | U   | 108 | % |
| Pyrene                     | 5800 |   |   | D | % | D | %   | 10.0 | U   | 106 | % |
| Benzo (a) anthracene       | 2600 |   |   | D | % | D | %   | 5.00 | U   | 106 | % |
| Chrysene                   | 3300 |   |   | D | % | D | %   | 5.00 | U   | 100 | % |
| Benzo (b) fluoranthrene    | 2700 |   |   | D | % | D | %   | 5.00 | U   | 106 | % |
| Benzo (k) fluoranthrene    | 1100 |   |   | D | % | D | %   | 5.00 | U   | 110 | % |
| Benzo (a) pyrene           | 2300 |   |   | D | % | D | %   | 5.00 | U   | 109 | % |
| Dibenzo (a, h) anthracene  | 360  |   |   | D | % | D | %   | 5.00 | U   | 107 | % |
| Benzo (ghi) perylene       | 1100 |   |   | D | % | D | %   | 5.00 | U   | 106 | % |
| Indeno (1, 2, 3-cd) pyrene | 1000 |   |   | D | % | D | %   | 5.00 | U   | 105 | % |

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

11/16/04

10/27/04

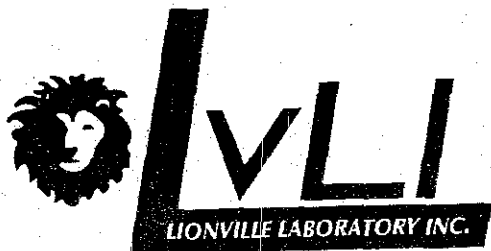
0000011

7000000000

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000012**



## Analytical Report

Client: TNU HANFORD B03-015  
LVL#: 0410L868  
SDG/SAF#: H2776/B03-015

W.O.#: 11343-606-001-9999-00  
Date Received: 10-13-2004


### PAH

One (1) soil sample was collected on 10-11-2004.

The sample and its associated QC samples were extracted on 10-20-2004 and analyzed according to criteria set for the in Lionville Laboratory SOPs based on SW846, 3rd Edition for Polycyclic Aromatic Hydrocarbons on 10-20-2004. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LVL's sample acceptance policy.
2. The sample was extracted and analyzed within required holding time.
3. The method blank was below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. The matrix spike recoveries were unobtainable due to the dilution required for the analyses.
7. The sample required a 10-fold instrument dilution due to high concentration of target analytes. The reporting limits were adjusted to reflect the necessary dilution.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

son\vr\group\data\pah\tnu hanford\0410-868.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

000013

02



| Bechtel Hanford Inc.  |  | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |  |   |  | B03-015-262                          |            | Page 1 of 1  |            |            |
|---|--|--|--|---|--|--------------------------------------|------------|--|------------|------------|
| Collector<br>Stankovich/Rivers  |  | Company Contact<br>M Stankovich          |  | Telephone No.<br>531-7620               |  | Project Coordinator<br>KESSNER, JH   |            | Price Code <del>8B</del><br>8C   |            |            |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                 |  | Sampling Location<br>100-F-12            |  | SAF No.<br>B03-015                      |  | Air Quality <input type="checkbox"/> |            | Data Turnaround<br><del>7 Days</del><br>15 Days  |            |            |
| Ice Chest No.<br>ERC 01 030   |  | Field Logbook No.<br>EL 1578-3           |  | COA<br>C10F126700                       |  | Method of Shipment<br>Fed Ex         |            | CKR 10/11/04   |            |            |
| Shipped To<br>LVH<br><del>BERLING SERVICES (Formerly TMA)</del>                   |  | Offsite Property No.<br>A050 013         |  | Bill of Lading/Air Bill No.<br>555 08PC |  |                                      |            |  |            |            |
| POSSIBLE SAMPLE HAZARDS/REMARKS<br><br>Special Handling and/or Storage<br>Cool 4c |  |  |  | Preservation                            |  |                                      |            |  |            |            |
|   |  |  |  | Type of Container                       |  | G/P                                  | G/P        | aG   | aG         | G          |
|   |  |  |  | No. of Container(s)                     |  | 1                                    | 1          | 1  | 1          | 1          |
|   |  |  |  | Volume                                  |  | 250mL<br>10-12-15 8                  | 120mL<br>Q | 250mL<br>A   | 250mL<br>D | 250mL<br>E |
| SAMPLE ANALYSIS   |  |  |  | See item (1) in Special Instructions.   |  | Chromium Hex - 719b                  |            | PCBs - 8082; Pesticides - 8081, Chloro-Hydrocarbons - 8083, 8084, 8085, 8086, 8087, 8088, 8089, 8090, 8091, 8092, 8093, 8094, 8095, 8096, 8097, 8098, 8099, 8100, 8101, 8102, 8103, 8104, 8105, 8106, 8107, 8108, 8109, 8110, 8111, 8112, 8113, 8114, 8115, 8116, 8117, 8118, 8119, 8120, 8121, 8122, 8123, 8124, 8125, 8126, 8127, 8128, 8129, 8130, 8131, 8132, 8133, 8134, 8135, 8136, 8137, 8138, 8139, 8140, 8141, 8142, 8143, 8144, 8145, 8146, 8147, 8148, 8149, 8150, 8151, 8152, 8153, 8154, 8155, 8156, 8157, 8158, 8159, 8160, 8161, 8162, 8163, 8164, 8165, 8166, 8167, 8168, 8169, 8170, 8171, 8172, 8173, 8174, 8175, 8176, 8177, 8178, 8179, 8180, 8181, 8182, 8183, 8184, 8185, 8186, 8187, 8188, 8189, 8190, 8191, 8192, 8193, 8194, 8195, 8196, 8197, 8198, 8199, 8200, 8201, 8202, 8203, 8204, 8205, 8206, 8207, 8208, 8209, 8210, 8211, 8212, 8213, 8214, 8215, 8216, 8217, 8218, 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8385, 8386, 8387, 8388, 8389, 8390, 8391, 8392, 8393, 8394, 8395, 8396, 8397, 8398, 8399, 8400, 8401, 8402, 8403, 8404, 8405, 8406, 8407, 8408, 8409, 8410, 8411, 8412, 8413, 8414, 8415, 8416, 8417, 8418, 8419, 8420, 8421, 8422, 8423, 8424, 8425, 8426, 8427, 8428, 8429, 8430, 8431, 8432, 8433, 8434, 8435, 8436, 8437, 8438, 8439, 8440, 8441, 8442, 8443, 8444, 8445, 8446, 8447, 8448, 8449, 8450, 8451, 8452, 8453, 8454, 8455, 8456, 8457, 8458, 8459, 8460, 8461, 8462, 8463, 8464, 8465, 8466, 8467, 8468, 8469, 8470, 8471, 8472, 8473, 8474, 8475, 8476, 8477, 8478, 8479, 8480, 8481, 8482, 8483, 8484, 8485, 8486, 8487, 8488, 8489, 8490, 8491, 8492, 8493, 8494, 8495, 8496, 8497, 8498, 8499, 8500, 8501, 8502, 8503, 8504, 8505, 8506, 8507, 8508, 8509, 8510, 8511, 8512, 8513, 8514, 8515, 8516, 8517, 8518, 8519, 8520, 8521, 8522, 8523, 8524, 8525, 8526, 8527, 8528, 8529, 8530, 8531, 8532, 8533, 8534, 8535, 8536, 8537, 8538, 8539, 8540, 8541, 8542, 8543, 8544, 8545, 8546, 8547, 8548, 8549, 8550, 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9049, 9050, 9051, 9052, 9053, 9054, 9055, 9056, 9057, 9058, 9059, 9060, 9061, 9062, 9063, 9064, 9065, 9066, 9067, 9068, 9069, 9070, 9071, 9072, 9073, 9074, 9075, 9076, 9077, 9078, 9079, 9080, 9081, 9082, 9083, 9084, 9085, 9086, 9087, 9088, 9089, 9090, 9091, 9092, 9093, 9094, 9095, 9096, 9097, 9098, 9099, 9100, 9101, 9102, 9103, 9104, 9105, 9106, 9107, 9108, 9109, 9110, 9111, 9112, 9113, 9114, 9115, 9116, 9117, 9118, 9119, 9120, 9121, 9122, 9123, 9124, 9125, 9126, 9127, 9128, 9129, 9130, 9131, 9132, 9133, 9134, 9135, 9136, 9137, 9138, 9139, 9140, 9141, 9142, 9143, 9144, 9145, 9146, 9147, 9148, 9149, 9150, 9151, 9152, 9153, 9154, 9155, 9156, 9157, 9158, 9159, 9160, 9161, 9162, 9163, 9164, 9165, 9166, 9167, 9168, 9169, 9170, 9171, 9172, 9173, 9174, 9175, 9176, 9177, 9178, 9179, 9180, 9181, 9182, 9183, 9184, 9185, 9186, 9187, 9188, 9189, 9190, 9191, 9192, 9193, 9194, 9195, 9196, 9197, 9198, 9199, 9200, 9201, 9202, 9203, 9204, 9205, 9206, 9207, 9208, 9209, 9210, 9211, 9212, 9213, 9214, 9215, 9216, 9217, 9218, 9219, 9220, 9221, 9222, 9223, 9224, 9225, 9226, 9227, 9228, 9229, 9230, 9231, 9232, 9233, 9234, 9235, 9236, 9237, 9238, 9239, 9240, 9241, 9242, 9243, 9244, 9245, 9246, 9247, 9248, 9249, 9250, 9251, 9252, 9253, 9254, 9255, 9256, 9257, 9258, 9259, 9260, 9261, 9262, 9263, 9264, 9265, 9266, 9267, 9268, 9269, 9270, 9271, 9272, 9273, 9274, 9275, 9276, 9277, 9278, 9279, 9280, 9281, 9282, 9283, 9284, 9285, 9286, 9287, 9288, 9289, 9290, 9291, 9292, 9293, 9294, 9295, 9296, 9297, 9298, 9299, 9300, 9301, 9302, 9303, 9304, 9305, 9306, 9307, 9308, 9309, 9310, 9311, 9312, 9313, 9314, 9315, 9316, 9317, 9318, 9319, 9320, 9321, 9322, 9323, 9324, 9325, 9326, 9327, 9328, 9329, 9330, 9331, 9332, 9333, 9334, 9335, 9336, 9337, 9338, 9339, 9340, 9341, 9342, 9343, 9344, 9345, 9346, 9347, 9348, 9349, 9350, 9351, 9352, 9353, 9354, 9355, 9356, 9357, 9358, 9359, 9360, 9361, 9362, 9363, 9364, 9365, 9366, 9367, 9368, 9369, 9370, 9371, 9372, 9373, 9374, 9375, 9376, 9377, 9378, 9379, 9380, 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9713, 9714, 9715, 9716, 9717, 9718, 9719, 9720, 9721, 9722, 9723, 9724, 9725, 9726, 9727, 9728, 9729, 9730, 9731, 9732, 9733, 9734, 9735, 9736, 9737, 9738, 9739, 9740, 9741, 9742, 9743, 9744, 9745, 9746, 9747, 9748, 9749, 9750, 9751, 9752, 9753, 9754, 9755, 9756, 9757, 9758, 9759, 9760, 9761, 9762, 9763, 9764, 9765, 9766, 9767, 9768, 9769, 9770, 9771, 9772, 9773, 9774, 9775, 9776, 9777, 9778, 9779, 9780, 9781, 9782, 9783, 9784, 9785, 9786, 9787, 9788, 9789, 9790, 9791, 9792, 9793, 9794, 9795, 9796, 9797, 9798, 9799, 9800, 9801, 9802, 9803, 9804, 9805, 9806, 9807, 9808, 9809, 9810, 9811, 9812, 9813, 9814, 9815, 9816, 9817, 9818, 9819, 9820, 9821, 9822, 9823, 9824, 9825, 9826, 9827, 9828, 9829, 9830, 9831, 9832, 9833, 9834, 9835, 9836, 9837, 9838, 9839, 9840, 9841, 9842, 9843, 9844, 9845, 9846, 9847, 9848, 9849, 9850, 9851, 9852, 9853, 9854, 9855, 9856, 9857, 9858, 9859, 9860, 9861, 9862, 9863, 9864, 9865, 9866, 9867, 9868, 9869, 9870, 9871, 9872, 9873, 9874, 9875, 9876, 9877, 9878, 9879, 9880, 9881, 9882, 9883, 9884, 9885, 9886, 9887, 9888, 9889, 9890, 9891, 9892, 9893, 9894, 9895, 9896, 9897, 9898, 9899, 9900, 9901, 9902, 9903, 9904, 9905, 9906, 9907, 9908, 9909, 9910, 9911, 9912, 9913, 9914, 9915, 9916, 9917, 9918, 9919, 9920, 9921, 9922, 9923, 9924, 9925, 9926, 9927, 9928, 9929, 9930, 9931, 9932, 9933, 9934, 9935, 9936, 9937, 9938, 9939, 9940, 9941, 9942, 9943, 9944, 9945, 9946, 9947, 9948, 9949, 9950, 9951, 9952, 9953, 9954, 9955, 9956, 9957, 9958, 9959, 9960, 9961, 9962, 9963, 9964, 9965, 9966, 9967, 9968, 9969, 9970, 9971, 9972, 9973, 9974, 9975, 9976, 9977, 9978, 9979, 9980, 9981, 9982, 9983, 9984, 9985, 9986, 9987, 9988, 9989, 9990, 9991, 9992, 9993, 9994 |            |            |

| Bechtel Hanford Inc.  |  | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |  |   |       |                                    | B03-015-261 |  | Page 1 of 1 |  |  |  |
|---|--|--|--|---|-------|------------------------------------|-------------|--|-------------|--|--|--|
| Collector<br>Stankovich/Rivera  |  | Company Contact<br>M Stankovich          |  | Telephone No.<br>531-7620                   |       | Project Coordinator<br>KESSNER, JH |             | Price Code <b>8B</b><br><b>8C</b>  |             | Data Turnaround<br><b>7 Days</b><br><b>15 Days</b> |  |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                               |  | Sampling Location<br>100-F-12            |  | SAF No.<br>B03-015                          |       | Air Quality <b>11</b>              |             | <b>CR</b>  |             | <b>10/11/04</b>                                    |  |  |
| Ice Chest No. <b>ERC 01 03 0</b>  |  | Field Logbook No.<br>EL 1578-3           |  | COA<br>C10F126700                           |       | Method of Shipment<br>Fed Ex       |             |  |             |  |  |  |
| Shipped To <b>LVL</b><br><b>LEDGERLINE SERVICES (Formerly TWA)</b>                              |  | Offsite Property No. <b>A050 013</b>     |  | Bill of Lading/Air Bill No. <b>SEE OSPC</b> |       |                                    |             |  |             |  |  |  |
| <b>POSSIBLE SAMPLE HAZARDS/REMARKS</b><br><br><b>Special Handling and/or Storage</b><br>Cool 4c |  | Preservation                             |  |   |       |                                    |             |  |             |  |  |  |
|   |  | Type of Container                        |  | G/P   | G/P   | G/P                                | aG          | G  |             |  |  |  |
|   |  | No. of Container(s)                      |  | 1   | 1     | 1                                  | 1           | 1  |             |  |  |  |
|   |  | Volume                                   |  | 1000mL                                      | 250mL | 120mL                              | 250mL       | 60mL   |             |  |  |  |
| <b>000015</b><br><br><b>SAMPLE ANALYSIS</b>   |  | See Item (1) in Special Instructions.    |  | See Item (2) in Special Instructions.       |       | Chromium Hex - 7196                |             | PCBs - 8082; Pesticides - 8084; Chloro-Hydrocarbons - 8085; EPA 821-G  |             | VOA - 8260A (TCL)                                  |  |  |
|   |  |  |  |   |       |                                    |             |  |             |  |  |  |
| Sample No.  |  | Matrix *                                 |  | Sample Date                                 |       | Sample Time                        |             |  |             |  |  |  |
| J01XR3  |  | SOIL                                     |  | 10/11/04                                    |       | 1035                               |             | X  |             | X  |  |  |
| J01XR4  |  | SOIL                                     |  | 10/11/04                                    |       | 1035                               |             | X  |             | X  |  |  |
| J01XR5  |  | SOIL                                     |  | 10/11/04                                    |       | 1030                               |             | X  |             | X  |  |  |
|   |  |  |  |   |       |                                    |             |  |             |  |  |  |
|   |  |  |  |   |       |                                    |             |  |             |  |  |  |
| CHAIN OF POSSESSION   |  |  |  | Sign/Print Names                            |       |                                    |             | SPECIAL INSTRUCTIONS   |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             | (1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241, Americium-244, Gross Alpha & Gross Beta; Nickel-63, Isotopic Plutonium [Plutonium-238, Plutonium-239/240], Strontium-90, Total Strontium-90, Isotopic Uranium [Uranium-233/234, Uranium-235, Uranium-238], Total Uranium-238]; (2) ICP Metals - 6010TR (SW846) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV) |             |  |  |  |
| Chris Rivera  |  | 10/11/04 1200                            |  | 3728 Ref 2B                                 |       | 10/11/04 1200                      |             |  |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             |  |             |  |  |  |
| REF 2B 3728   |  | 10/12/04 0900                            |  | S. GALE                                     |       | 10/12/04 0900                      |             |  |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             |  |             |  |  |  |
| S. GALE   |  | 10/12/04 0900                            |  | FED EX                                      |       |                                    |             |  |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             | Personnel not available to relinquish samples from 3728 Ref # 2B on 10/12/04   |             |  |  |  |
| F. E. E.  |  | 10-13-04 1005                            |  | V. H. H.                                    |       | 10-13-04 1005                      |             |  |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             |  |             |  |  |  |
| Relinquished By/Removed From  |  | Date/Time                                |  | Received By/Stored In                       |       | Date/Time                          |             |  |             |  |  |  |
| LABORATORY SECTION  |  | Received By                              |  | Title                                       |       | Date/Time                          |             |  |             |  |  |  |
| FINAL SAMPLE DISPOSITION  |  | Disposal Method                          |  | Disposed By                                 |       | Date/Time                          |             |  |             |  |  |  |

Matrix \*

S= Soil  
SR= Sediment  
SD= Solid  
SL= Sludge  
W= Water  
O= Oil  
A= Air  
DS= Drums Solids  
DL= Drum Liquids  
T= Tissue  
W= Wipe  
L= Liquid  
V= Vegetation  
X= Other

## **Appendix 5**

### **Data Validation Supporting Documentation**

## GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

|   |      |                 |                              |                       |             |
|---|------|-----------------|------------------------------|-----------------------|-------------|
| VALIDATION LEVEL:                         | A    | B               | <u>C</u>                     | D                     | E           |
| PROJECT: <u>RWS 100F-12-1607-FT/11/04</u> |      |                 | DATA PACKAGE: <u>H27677C</u> |                       |             |
| VALIDATOR: <u>TLI</u>                     |      | LAB: <u>LLI</u> |                              | DATE: <u>11/12/04</u> |             |
|   |      |                 | SDG: <u>H27677C</u>          |                       |             |
| ANALYSES PERFORMED                        |      |                 |                              |                       |             |
| 8015                                      | 8021 | 8141            | 8151                         | 8315                  | <u>8310</u> |
|   |      | WTPH-HCID       | WTPH-G                       | WTPH-D                |             |
|   |      |                 |                              |                       |             |
| SAMPLES/MATRIX:                           |      |                 |                              |                       |             |
| <u>JOXV2</u>                              |      |                 |                              |                       |             |
|   |      |                 |                              |                       |             |
|   |      |                 |                              |                       |             |
|   |      |                 |                              |                       |             |
| <u>Soil</u>                               |      |                 |                              |                       |             |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: \_\_\_\_\_

## 2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

Initial calibrations acceptable? ..... Yes No N/AContinuing calibrations acceptable? ..... Yes No N/AStandards traceable? ..... Yes No N/AStandards expired? ..... Yes No N/ACalculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

## GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)..... Yes No N/A  
 Calibration blank results acceptable? (Levels D, E)..... Yes No N/A  
 Laboratory blanks analyzed?..... Yes No N/A  
 Laboratory blank results acceptable?..... Yes No N/A  
 Field/trip blanks analyzed? (Levels C, D, E)..... Yes No N/A  
 Field/trip blank results acceptable? (Levels C, D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Comments: no FB

## 4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?..... Yes No N/A  
 Surrogate/system monitoring compound recoveries acceptable?..... Yes No N/A  
 Surrogates traceable? (Levels D, E)..... Yes No N/A  
 Surrogates expired? (Levels D, E)..... Yes No N/A  
 MS/MSD samples analyzed?..... Yes No N/A  
 MS/MSD results acceptable?..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E)..... Yes No N/A  
 MS/MSD standards expired? (Levels D, E)..... Yes No N/A  
 LCS/BSS samples analyzed?..... Yes No N/A  
 LCS/BSS results acceptable?..... Yes No N/A  
 Standards traceable? (Levels D, E)..... Yes No N/A  
 Standards expired? (Levels D, E)..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
 Performance audit sample(s) analyzed?..... Yes No N/A  
 Performance audit sample results acceptable?..... Yes No N/A

Comments: Surv deleted out - J all  
MS - deleted out - J all

NO P45

## GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Duplicate results acceptable? ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes ☐ No ☒ N/A ☐

MS/MSD standards expired? (Levels D, E) ..... Yes ☐ No ☒ N/A ☐

Field duplicate RPD values acceptable? ..... Yes ☐ No ☒ N/A ☐

Field split RPD values acceptable? ..... Yes ☐ No ☒ N/A ☐

Transcription/calculation errors? (Levels D, E) ..... Yes ☐ No ☒ N/A ☐

Comments:

MS/MSD diluted as - J all

## 6. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes ☒ No ☐ N/A ☐

Sample holding times acceptable? ..... Yes ☒ No ☐ N/A ☐

Comments:

## GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A  
Results supported in the raw data? (Levels D, E)..... Yes No N/A  
Samples properly prepared? (Levels D, E) ..... Yes No N/A  
Detection limits meet RDL? ..... Yes No N/A  
Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
Comments: all under one - 3

## 9. SAMPLE CLEANUP (Levels D and E)

Fluorilicil ® (or other aborbant) cleanup performed?..... Yes No N/A  
Lot check performed? ..... Yes No N/A  
Check recoveries acceptable? ..... Yes No N/A  
Check materials traceable? ..... Yes No N/A  
Check materials Expired? ..... Yes No N/A  
Analytical batch QC given similar cleanup?..... Yes No N/A  
Transcription/Calculation Errors?..... Yes No N/A  
Comments: \_\_\_\_\_

Date: 16 November 2004  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: Remaining Sites Confirmation Sampling - Soil - Waste Site 100-F-12  
Subject: Radiochemistry - Data Package No. H2776-EB (SDG No. H2776)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H2776 prepared by Eberline Services Inc. (EB). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Waste Site | Analysis   |
|-----------|-------------|-------|------------|------------|------------|
| J01XR3    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |
| J01XR4    | 10/11/04    | Soil  | C          | 100-F-12   | See note 1 |

1 - Gamma spectroscopy, gross alpha/beta.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

## **DATA QUALITY PARAMETERS**

- Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

000001



- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit

000002

is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

#### Field Duplicate

One set of field duplicates (J01XR3/J01XR4) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for potassium-40 was outside QC limits (62%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Ten analytes were reported above the RQL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific RQL.

- **Completeness**

Data package No. H2776 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

Ten analytes were reported above the RQL. Under the BHI statement of work, no qualification is required.

## REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

**000005**

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

## **Appendix 2**

### **Summary of Data Qualification**

**000007**

# RADIOCHEMISTRY DATA QUALIFICATION SUMMARY\*

|                                  |                  |                |                           |
|----------------------------------|------------------|----------------|---------------------------|
| SDG: H2776                       | REVIEWER:<br>TLI | DATE: 11/16/04 | PAGE <u>1</u> OF <u>1</u> |
| COMMENTS: No qualifiers assigned |                  |                |                           |

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

## **Appendix 3**

### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**



|                          |          |        |    |           |    |        |   |        |   |
|--------------------------|----------|--------|----|-----------|----|--------|---|--------|---|
| Project: BECHTEL-HANFORD |          |        |    |           |    |        |   |        |   |
| Laboratory: EB           |          |        |    |           |    |        |   |        |   |
| Case: SDG: H2776         |          |        |    |           |    |        |   |        |   |
| Sample Number            | J01XR3   |        |    | J01XR4    |    |        |   |        |   |
| Remarks                  |          |        |    | Duplicate |    |        |   |        |   |
| Sample Date              | 10/11/04 |        |    | 10/11/04  |    |        |   |        |   |
| Radiochemistry           | RQL      | Result | Q  | Result    | Q  | Result | Q | Result | Q |
| Gross Alpha              |          | 8.84   |    | 8.82      |    |        |   |        |   |
| Gross Beta               |          | 18.7   |    | 18.1      |    |        |   |        |   |
| Potassium-40             |          | 7.78   |    | 14.8      |    |        |   |        |   |
| Cobalt 60                | 0.05     | U      | U* | U         | U* |        |   |        |   |
| Cesium 137               | 0.05     | U      | U* | U         | U* |        |   |        |   |
| Radium-226               |          | U      | U  | 0.572     |    |        |   |        |   |
| Radium-228               |          | U      | U  | 0.748     |    |        |   |        |   |
| Europium 152             | 0.1      | U      | U* | U         | U* |        |   |        |   |
| Europium 154             | 0.1      | U      | U* | U         | U* |        |   |        |   |
| Europium 155             | 0.1      | U      | U* | U         | U* |        |   |        |   |
| Thorium-228              |          | 0.872  |    | 0.758     |    |        |   |        |   |
| Thorium-232              |          | U      | U  | 0.748     |    |        |   |        |   |
| Uranium-235(gea)         |          | U      | U  | U         | U  |        |   |        |   |
| Uranium-238(gea)         |          | U      | U  | U         | U  |        |   |        |   |
| Americium-241(gea)       |          | U      | U  | U         | U  |        |   |        |   |
|                          |          |        |    |           |    |        |   |        |   |
|                          |          |        |    |           |    |        |   |        |   |

000010

\* - RQL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2776**

R410078-01

J01XR3

**DATA SHEET**

|                                   |  |                  |
|-----------------------------------|--|------------------|
| SDG <u>7128</u>                   | Client/Case no <u>Hanford</u>          | SDG <u>H2776</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u>                |                  |
| Lab sample id <u>R410078-01</u>   | Client sample id <u>J01XR3</u>         |                  |
| Dept sample id <u>7128-001</u>    | Location/Matrix <u>100-F-12</u>        | <u>SOLID</u>     |
| Received <u>10/13/04</u>          | Collected/Weight <u>10/11/04 10:35</u> | <u>1062 g</u>    |
| % solids <u>91.8</u>              | Custody/SAF No <u>B03-015-261</u>      | <u>B03-015</u>   |

| ANALYTE       | CAS NO     | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha   | 12587-46-1 | 8.84            | 4.0               | 3.3          | 10           |                 | 93A  |
| Gross Beta    | 12587-47-2 | 18.7            | 4.4               | 5.5          | 15           |                 | 93B  |
| Potassium 40  | 13966-00-2 | 7.78            | 0.76              | 0.48         |              |                 | GAM  |
| Cobalt 60     | 10198-40-0 | U               |                   | 0.070        | 0.050        | U               | GAM  |
| Cesium 137    | 10045-97-3 | U               |                   | 0.059        | 0.10         | U               | GAM  |
| Radium 226    | 13982-63-3 | U               |                   | 0.13         | 0.10         | U               | GAM  |
| Radium 228    | 15262-20-1 | U               |                   | 0.32         | 0.20         | U               | GAM  |
| Europium 152  | 14683-23-9 | U               |                   | 0.20         | 0.10         | U               | GAM  |
| Europium 154  | 15585-10-1 | U               |                   | 0.24         | 0.10         | U               | GAM  |
| Europium 155  | 14391-16-3 | U               |                   | 0.11         | 0.10         | U               | GAM  |
| Thorium 228   | 14274-82-9 | 0.872           | 0.079             | 0.075        |              |                 | GAM  |
| Thorium 232   | TH-232     | U               |                   | 0.32         |              | U               | GAM  |
| Uranium 235   | 15117-96-1 | U               |                   | 0.19         |              | U               | GAM  |
| Uranium 238   | U-238      | U               |                   | 7.8          |              | U               | GAM  |
| Americium 241 | 14596-10-2 | U               |                   | 0.072        |              | U               | GAM  |

Remaining Sites Conf. Sampling-Soil

*Handwritten signature*  
*11/16/04*

**000011**

|                             |
|-----------------------------|
| Lab id <u>EBERLINE</u>      |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DS</u>          |
| Version <u>3.06</u>         |
| Report date <u>11/01/04</u> |

**EBERLINE SERVICES / RICHMOND**

**SAMPLE DELIVERY GROUP H2776**

**R410078-02**

**J01XR4**

**DATA SHEET**

|                                   |  |                  |
|-----------------------------------|--|------------------|
| SDG <u>7128</u>                   | Client/Case no <u>Hanford</u>          | SDG <u>H2776</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u>                |                  |
| Lab sample id <u>R410078-02</u>   | Client sample id <u>J01XR4</u>         |                  |
| Dept sample id <u>7128-002</u>    | Location/Matrix <u>100-F-12</u>        | <u>SOLID</u>     |
| Received <u>10/13/04</u>          | Collected/Weight <u>10/11/04 10:35</u> | <u>1027 g</u>    |
| % solids <u>91.6</u>              | Custody/SAF No <u>B03-015-261</u>      | <u>B03-015</u>   |

| ANALYTE       | CAS NO     | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha   | 12587-46-1 | 8.82            | 3.9               | 3.6          | 10           |                 | 93A  |
| Gross Beta    | 12587-47-2 | 18.1            | 4.6               | 6.0          | 15           |                 | 93B  |
| Potassium 40  | 13966-00-2 | 14.8            | 1.1               | 0.52         |              |                 | GAM  |
| Cobalt 60     | 10198-40-0 | U               |                   | 0.054        | 0.050        | U               | GAM  |
| Cesium 137    | 10045-97-3 | U               |                   | 0.051        | 0.10         | U               | GAM  |
| Radium 226    | 13982-63-3 | 0.572           | 0.10              | 0.10         | 0.10         |                 | GAM  |
| Radium 228    | 15262-20-1 | 0.748           | 0.19              | 0.21         | 0.20         |                 | GAM  |
| Europium 152  | 14683-23-9 | U               |                   | 0.12         | 0.10         | U               | GAM  |
| Europium 154  | 15585-10-1 | U               |                   | 0.18         | 0.10         | U               | GAM  |
| Europium 155  | 14391-16-3 | U               |                   | 0.13         | 0.10         | U               | GAM  |
| Thorium 228   | 14274-82-9 | 0.758           | 0.058             | 0.056        |              |                 | GAM  |
| Thorium 232   | TH-232     | 0.748           | 0.19              | 0.21         |              |                 | GAM  |
| Uranium 235   | 15117-96-1 | U               |                   | 0.18         |              | U               | GAM  |
| Uranium 238   | U-238      | U               |                   | 6.7          |              | U               | GAM  |
| Americium 241 | 14596-10-2 | U               |                   | 0.18         |              | U               | GAM  |

Remaining Sites Conf. Sampling-Soil

*Handwritten:* 11/14/04

**000012**

|                             |
|-----------------------------|
| Lab id <u>EBRLNE</u>        |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DS</u>          |
| Version <u>3.06</u>         |
| Report date <u>11/01/04</u> |

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000013**

## 1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2776 was composed of two soil samples designated under SAF No. B03-015 with a Project Designation of: Remaining Sites Confirmation Sampling – Soil.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-mail on November 2, 2004. The electronic data deliverable (EDD) was transmitted to BHI via e-mail on November 3, 2004.

## 2.0 ANALYSIS NOTES

### 2.1 Gross Alpha and Gross Beta Analyses

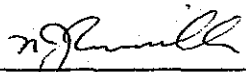
No problems were encountered during the course of the analyses.

### 2.2 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

### Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

  
For Melissa C. Mannion  
Senior Program Manager

11/3/4  
Date

| Bechtel Hanford Inc.   |          |   |             |    |    | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST                          |                                       |                     |   |   |      |  | B03-015-261                          | Page 1 of 1 |  |                                  |  |  |  |
|--|----------|---|-------------|----|----|---|---------------------------------------|---------------------|---|---|------|--|--------------------------------------|-------------|--|----------------------------------|--|--|--|
| Collector<br>Stankovich/Rivera   |          |   |             |    |    | Company Contact<br>M Stankovich                                   |                                       |                     |   | Telephone No.<br>531-7620                   |      |  | Project Coordinator<br>KESSNER, JH   |             |  | Price Code <b>8B</b>             |  | Data Turnaround  |  |
| Project Designation<br>Remaining Sites Confirmation Sampling-Soil                            |          |   |             |    |    | Sampling Location<br><b>H2776 (7128)</b><br>100-F-12              |                                       |                     |   | SAF No.<br>B03-015                          |      |  | Air Quality <input type="checkbox"/> |             |  | <b>-7 Days</b><br><b>15 Days</b> |  |  |  |
| Ice Chest No. <b>AFS 04 058</b>  |          |   |             |    |    | Field Logbook No.<br>EL 1578-3                                    |                                       |                     |   | COA<br>C10FI26700                           |      |  | Method of Shipment<br>Fed Ex         |             |  | <b>CKR 10/11/04</b>              |  |  |  |
| Shipped To<br>ENERLINE SERVICES (Formerly TMA)<br>POSSIBLE SAMPLE HAZARDS/REMARKS            |          |   |             |    |    | Offsite Property No. <b>A050 003</b>                              |                                       |                     |   | Bill of Lading/Air Bill No. <b>SEE OSPC</b> |      |  |                                      |             |  |                                  |  |  |  |
| Special Handling and/or Storage<br><b>Cool Jr</b><br><b>0000015</b>                          |          |   |             |    |    | Preservation  |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
|  |          |   |             |    |    | Type of Container   | G/P                                   | G/P                 | G/P   | aG  | G    |  |                                      |             |  |                                  |  |  |  |
|  |          |   |             |    |    | No. of Container(s)   | I                                     | I                   | I   | I   | I    |  |                                      |             |  |                                  |  |  |  |
|  |          |   |             |    |    | Volume  | 1000mL                                | 250mL               | 120mL   | 250mL                                       | 60mL |  |                                      |             |  |                                  |  |  |  |
| SAMPLE ANALYSIS  |          |   |             |    |    | See item (1) in Special Instructions.                             | See item (2) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082; Pesticides - 8084; Chloro-Hydrocarbons - EPA 8151. | VOA - 8260A (TCL)                           |      |  |                                      |             |  |                                  |  |  |  |
| Sample No.   | Matrix * | Sample Date   | Sample Time | X  | X  | X   | X                                     |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| J01XR3   | SOIL     | 10/11/04  | 1035        | X  | X  | X   | X                                     |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| J01XR4   | SOIL     | 10/11/04  | 1035        | X  | X  | X   | X                                     |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| J01XR5   | SOIL     | 10/11/04  | 1030        | /X | /X | /X  | /X                                    |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
|  |          |   |             |    |    |   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
|  |          |   |             |    |    |   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| CHAIN OF POSSESSION  |          |   |             |    |    | Sign/Print Names  |                                       |                     |   |   |      | SPECIAL INSTRUCTIONS   |                                      |             |  |                                  |  | Matrix *   |  |
| Relinquished By/Removed From<br><b>Chris Rivera</b> <b>CHRIS RIVERA</b> <b>10/11/04 1200</b> |          |   |             |    |    | Received By/Stored In<br><b>Ref. ZB</b> <b>10/11/04 1200</b>      |                                       |                     |   |   |      | (1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec Add-on [Americium-241, Americium-244] Gross Alpha & Gross Beta; Nickel-63, Isotopic Plutonium (Plutonium-238, Plutonium-239/240), Strontium-90, Total Sr-Yttrium-90, Isotopic Uranium (Uranium-232/234, Uranium-235, Uranium-238); <b>M/S 10/20/04</b> |                                      |             |  |                                  |  | S=Soil SE=Sediment SD=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solid DL=Drum Liquid T=Tissue WI=Wipe LI=Liquid V=Vegetation X=X Other |  |
| Relinquished By/Removed From<br><b>REF 2 B 3728</b> <b>10/20/04 0900</b>                     |          |   |             |    |    | Received By/Stored In<br><b>SJGALE</b> <b>10/20/04 0900</b>       |                                       |                     |   |   |      | (2) ICP Metals - 6010TR (SW846) Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV)  |                                      |             |  |                                  |  |  |  |
| Relinquished By/Removed From<br><b>SJGALE</b> <b>10/20/04 0900</b>                           |          |   |             |    |    | Received By/Stored In<br><b>FED EX</b>                            |                                       |                     |   |   |      | Personnel not available to relinquish samples from 3728 Ref # <b>ZB</b> on <b>10/12/04</b>   |                                      |             |  |                                  |  |  |  |
| Relinquished By/Removed From<br><b>FEB 2</b> <b>10/13/04</b>                                 |          |   |             |    |    | Received By/Stored In<br><b>[Signature]</b> <b>10/13/04 10:30</b> |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| Relinquished By/Removed From   |          |   |             |    |    | Received By/Stored In   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| Relinquished By/Removed From   |          |   |             |    |    | Received By/Stored In   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| LABORATORY SECTION   |          | Received By _____ Title _____ Date/Time _____           |             |    |    |   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |
| FINAL SAMPLE DISPOSITION   |          | Disposal Method _____ Disposed By _____ Date/Time _____ |             |    |    |   |                                       |                     |   |   |      |  |                                      |             |  |                                  |  |  |  |

## **Appendix 5**

### **Data Validation Supporting Documentation**

## APPENDIX A

## RADIOCHEMICAL DATA VALIDATION CHECKLIST

|                    |              |               |                     |                    |   |
|--------------------|--------------|---------------|---------------------|--------------------|---|
| VALIDATION LEVEL:  | A            | B             | <u>C</u>            | D                  | E |
| PROJECT:           | RWS 100-F-12 |               | DATA PACKAGE: H2776 |                    |   |
| VALIDATOR:         | TCT          |               | LAB: ER3            | DATE: 11/12/04     |   |
|                    |              |               | SDG:                | H2776              |   |
| ANALYSES PERFORMED |              |               |                     |                    |   |
| Gross Alpha/Beta   | Strontium-90 | Technetium-99 | Alpha Spectroscopy  | Gamma Spectroscopy |   |
| Total Uranium      | Radium-22    | Tritium       |                     |                    |   |
| SAMPLES/MATRIX     |              |               |                     |                    |   |
| J01XR3 J01XR4      |              |               |                     |                    |   |
|                    |              |               |                     |                    |   |
|                    |              |               |                     |                    |   |
|                    |              |               |                     |                    |   |
|                    |              |               |                     |                    |   |

1. Completeness..... ☐ N/ATechnical verification forms present?..... Yes ☒ No ☐ N/A

Comments: \_\_\_\_\_

---



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2. Initial Calibration (Levels D, E)..... ☒ N/A

Instruments/detectors calibrated?..... Yes No N/A

Initial calibration acceptable?..... Yes No N/A

Standards NIST traceable?..... Yes No N/A

Standards Expired?..... Yes No N/A

Calculation check acceptable?..... Yes No N/A

Comments: \_\_\_\_\_

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3. Continuing Calibration (Levels D, E).....☒ N/A

Calibration checked within required frequency? .....Yes No N/A

Calibration check acceptable?.....Yes No N/A

Calibration check standards traceable?.....Yes No N/A

Calibration check standards expired? .....Yes No N/A

Calculation check acceptable?.....Yes No N/A

Comments:\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Background Counts (Levels D, E).....☒ N/A

Background Counts checked within required frequency? .....Yes No N/A

Background Counts acceptable?.....Yes No N/A

Calculation check acceptable? .....Yes No N/A

Comments:\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... ☒ Yes ☐ No ☐ N/A

Method blank results acceptable? ..... ☒ Yes ☐ No ☐ N/A

Analytes detected in method blank? ..... ☒ Yes ☐ No ☐ N/A

Field blank(s) analyzed? ..... ☒ Yes ☐ No ☐ N/A

Field blank results acceptable? ..... ☒ Yes ☐ No ☐ N/A

Analytes detected in field blank(s)? ..... ☒ Yes ☐ No ☐ N/A

Transcription/Calculation Errors? (Levels D, E) ..... ☒ Yes ☐ No ☐ N/A

Comments: NO FB

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... ☒ Yes ☐ No ☐ N/A

LCS/BSS recoveries acceptable? ..... ☒ Yes ☐ No ☐ N/A

LCS/BSS traceable? (Levels D,E) ..... ☒ Yes ☐ No ☐ N/A

LCS/BSS expired? (Levels D,E) ..... ☒ Yes ☐ No ☐ N/A

LCS/BSS levels correct? (Levels D,E) ..... ☒ Yes ☐ No ☐ N/A

Transcription/Calculation Errors? (Levels D, E) ..... ☒ Yes ☐ No ☐ N/A

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☒ N/A

Chemical carrier added? ..... ☐ Yes ☐ No ☐ N/A

Chemical recovery acceptable? ..... ☐ Yes ☐ No ☐ N/A

Chemical carrier traceable? (Levels D, E ) ..... ☐ Yes ☐ No ☐ N/A

Chemical carrier expired? (Levels D, E) .....Yes No N/A

Transcription/Calculation errors? (Levels D, E).....Yes No N/A

Comments: \_\_\_\_\_

8. Tracer Recovery (Levels C, D, E ) .....☒ N/A

Tracer added?.....Yes No N/A

Tracer recovery acceptable? .....Yes No N/A

Tracer traceable? (Levels D, E ) .....Yes No N/A

Tracer expired? (Levels D, E).....Yes No N/A

Transcription/Calculation errors? (Levels D, E).....Yes No N/A

Comments: \_\_\_\_\_

9. Matrix Spikes (Levels C, D, E).....☒ N/A

Matrix spike analyzed? .....Yes No N/A

Spike recoveries acceptable? .....Yes No N/A

Spike source traceable? (Levels D, E) .....Yes No N/A

Spike source expired? Levels D, E).....Yes No N/A

Transcription/Calculation Errors? (Levels D, E).....Yes No N/A

Comments: \_\_\_\_\_

10. Duplicates (Levels C, D, E) ..... ☐ N/ADuplicates Analyzed at required frequency? ..... ☒ Yes ☐ No ☐ N/ARPD Values Acceptable? ..... ☒ Yes ☐ No ☐ N/ATranscription/Calculation Errors? (Levels D, E) ..... ☐ Yes ☒ No ☐ N/A

Comments: .....

.....

.....

.....

11. Field QC Samples (Levels C, D E) ..... ☐ N/AField duplicate sample(s) analyzed? ..... ☒ Yes ☐ No ☐ N/AField duplicate RPD values acceptable? ..... ☐ Yes ☒ No ☐ N/AField split sample(s) analyzed? ..... ☐ Yes ☒ No ☐ N/AField split RPD values acceptable? ..... ☐ Yes ☐ No ☒ N/APerformance audit sample(s) analyzed? ..... ☐ Yes ☒ No ☐ N/APerformance audit sample results acceptable? ..... ☐ Yes ☐ No ☒ N/A

Comments: ..... NO PAS

R3/R4

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.....

.....

12. Holding Times (All levels)

Are sample holding times acceptable? ..... ☒ Yes ☐ No ☐ N/A

Comments: .....

.....

.....

.....

13. Results and Detection Limits (All Levels)..... ☐ N/A

Results reported for all required sample analyses?..... ☒ Yes ☐ No ☐ N/A

Results supported in raw data?(Levels D, E)..... Yes ☐ No ☒ N/A

Results Acceptable? (Levels D, E) ..... Yes ☐ No ☒ N/A

Transcription/Calculation errors? (Levels D, E)..... Yes ☐ No ☒ N/A

MDA's meet required detection limits? ..... Yes ☐ No ☒ N/A

Transcription/calculation errors? (Levels D, E)..... Yes ☐ No ☒ N/A

Comments: 10 over

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## **Appendix 6**

### **Additional Documentation Requested by Client**

**000023**

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2776**

R410078-04

Method Blank

**METHOD BLANK**

|                                   |                                      |                  |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7128</u>                   | Client/Case no <u>Hanford</u>        | SDG <u>H2776</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u>              |                  |
| Lab sample id <u>R410078-04</u>   | Client sample id <u>Method Blank</u> |                  |
| Dept sample id <u>7128-004</u>    | Material/Matrix <u>SOLID</u>         |                  |
|                                   | SAF No <u>B03-015</u>                |                  |

| ANALYTE       | CAS NO     | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha   | 12587-46-1 | -0.615          | 1.2               | 2.7          | 10           | U               | 93A  |
| Gross Beta    | 12587-47-2 | 1.40            | 3.9               | 5.4          | 15           | U               | 93B  |
| Potassium 40  | 13966-00-2 | U               |                   | 0.35         |              | U               | GAM  |
| Cobalt 60     | 10198-40-0 | U               |                   | 0.018        | 0.050        | U               | GAM  |
| Cesium 137    | 10045-97-3 | U               |                   | 0.019        | 0.10         | U               | GAM  |
| Radium 226    | 13982-63-3 | U               |                   | 0.035        | 0.10         | U               | GAM  |
| Radium 228    | 15262-20-1 | U               |                   | 0.084        | 0.20         | U               | GAM  |
| Europium 152  | 14683-23-9 | U               |                   | 0.046        | 0.10         | U               | GAM  |
| Europium 154  | 15585-10-1 | U               |                   | 0.047        | 0.10         | U               | GAM  |
| Europium 155  | 14391-16-3 | U               |                   | 0.058        | 0.10         | U               | GAM  |
| Thorium 228   | 14274-82-9 | U               |                   | 0.027        |              | U               | GAM  |
| Thorium 232   | TH-232     | U               |                   | 0.084        |              | U               | GAM  |
| Uranium 235   | 15117-96-1 | U               |                   | 0.066        |              | U               | GAM  |
| Uranium 238   | U-238      | U               |                   | 2.9          |              | U               | GAM  |
| Americium 241 | 14596-10-2 | U               |                   | 0.15         |              | U               | GAM  |

Remaining Sites Conf. Sampling-Soil

QC-BLANK #49388

METHOD BLANKS

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|                             |
|-----------------------------|
| Lab id <u>EBRLNE</u>        |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DS</u>          |
| Version <u>3.06</u>         |
| Report date <u>11/01/04</u> |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2776

R410078-03

Lab Control Sample

## LAB CONTROL SAMPLE

|                                   |  |                  |
|-----------------------------------|--|------------------|
| SDG <u>7128</u>                   | Client/Case no <u>Hanford</u>              | SDG <u>H2776</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u>                    |                  |
| Lab sample id <u>R410078-03</u>   | Client sample id <u>Lab Control Sample</u> |                  |
| Dept sample id <u>7128-003</u>    | Material/Matrix <u>SOLID</u>               |                  |
|                                   | SAF No <u>B03-015</u>                      |                  |

| ANALYTE     | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST | ADDED<br>pCi/g | 2σ ERR<br>pCi/g | REC<br>% | 3σ LMTS<br>(TOTAL) | PROTOCOL<br>LIMITS |
|-------------|-----------------|-------------------|--------------|--------------|-----------------|------|----------------|-----------------|----------|--------------------|--------------------|
| Gross Alpha | 214             | 16                | 2.8          | 10           |                 | 93A  | 214            | 8.6             | 100      | 67-133             | 70-130             |
| Gross Beta  | 222             | 11                | 5.4          | 15           |                 | 93B  | 214            | 8.6             | 104      | 75-125             | 70-130             |
| Cobalt 60   | 0.865           | 0.051             | 0.012        | 0.050        |                 | GAM  | 0.889          | 0.036           | 97       | 76-124             | 80-120             |
| Cesium 137  | 0.913           | 0.048             | 0.027        | 0.10         |                 | GAM  | 0.865          | 0.035           | 106      | 74-126             | 80-120             |

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QC-LCS #49387

LAB CONTROL SAMPLES

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|                             |
|-----------------------------|
| Lab id <u>EBRLNE</u>        |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-LCS</u>         |
| Version <u>3.06</u>         |
| Report date <u>11/01/04</u> |



**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H2776

R410078-05

J01XR3

**DUPLICATE**

|                                   |                                 |  |  |                  |
|-----------------------------------|---------------------------------|--|--|------------------|
| SDG <u>7128</u>                   |                                 | Client/Case no <u>Hanford</u>                        |  | SDG <u>H2776</u> |
| Contact <u>Melissa C. Mannion</u> |                                 | Contract No. <u>630</u>                              |  |                  |
| <b>DUPLICATE</b>                  |                                 | <b>ORIGINAL</b>                                      |  |                  |
| Lab sample id <u>R410078-05</u>   | Lab sample id <u>R410078-01</u> | Client sample id <u>J01XR3</u>                       |  |                  |
| Dept sample id <u>7128-005</u>    | Dept sample id <u>7128-001</u>  | Location/Matrix <u>100-F-12</u> <b>SOLID</b>         |  |                  |
|                                   | Received <u>10/13/04</u>        | Collected/Weight <u>10/11/04 10:35</u> <u>1062 g</u> |  |                  |
| % solids <u>91.8</u>              | % solids <u>91.8</u>            | Custody/SAF No <u>B03-015-261</u> <u>B03-015</u>     |  |                  |

| ANALYTE       | DUPLICATE<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | QUALI-<br>FIERS | RPD<br>% | 3σ<br>TOT | PROT<br>LIMIT |
|---------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|---------------|
| Gross Alpha   | 9.06               | 3.8               | 2.9          | 10           |                 | 93A  | 8.84              | 4.0               | 3.3          |                 | 2        | 102       |               |
| Gross Beta    | 19.0               | 4.5               | 5.8          | 15           |                 | 93B  | 18.7              | 4.4               | 5.5          |                 | 2        | 59        |               |
| Potassium 40  | 7.93               | 0.71              | 0.39         |              |                 | GAM  | 7.78              | 0.76              | 0.48         |                 | 2        | 38        |               |
| Cobalt 60     | U                  |                   | 0.061        | 0.050        | U               | GAM  | U                 |                   | 0.070        | U               | -        |           |               |
| Cesium 137    | U                  |                   | 0.058        | 0.10         | U               | GAM  | U                 |                   | 0.059        | U               | -        |           |               |
| Radium 226    | U                  |                   | 0.13         | 0.10         | U               | GAM  | U                 |                   | 0.13         | U               | -        |           |               |
| Radium 228    | U                  |                   | 0.29         | 0.20         | U               | GAM  | U                 |                   | 0.32         | U               | -        |           |               |
| Europium 152  | U                  |                   | 0.19         | 0.10         | U               | GAM  | U                 |                   | 0.20         | U               | -        |           |               |
| Europium 154  | U                  |                   | 0.22         | 0.10         | U               | GAM  | U                 |                   | 0.24         | U               | -        |           |               |
| Europium 155  | U                  |                   | 0.11         | 0.10         | U               | GAM  | U                 |                   | 0.11         | U               | -        |           |               |
| Thorium 228   | 0.798              | 0.073             | 0.072        |              |                 | GAM  | 0.872             | 0.079             | 0.075        |                 | 9        | 37        |               |
| Thorium 232   | U                  |                   | 0.29         |              | U               | GAM  | U                 |                   | 0.32         | U               | -        |           |               |
| Uranium 235   | U                  |                   | 0.18         |              | U               | GAM  | U                 |                   | 0.19         | U               | -        |           |               |
| Uranium 238   | U                  |                   | 7.2          |              | U               | GAM  | U                 |                   | 7.8          | U               | -        |           |               |
| Americium 241 | U                  |                   | 0.068        |              | U               | GAM  | U                 |                   | 0.072        | U               | -        |           |               |

Remaining Sites Conf. Sampling-Soil

QC-DUP#1 49389

**DUPLICATES**

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**SUMMARY DATA SECTION**

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|                             |
|-----------------------------|
| Lab id <u>EBRLNE</u>        |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DUP</u>         |
| Version <u>3.06</u>         |
| Report date <u>11/01/04</u> |

**000026**